IMPERIAL COUNTY
AIR POLLUTION CONTROL DISTRICT

October 30, 2016
Exceptional Event Documentation
For the Imperial County PM_{10} Nonattainment Area

FINAL DRAFT

December 11, 2018

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ACRONYM	DESCRIPTIONS
AOD	Aerosol Optical Depth
AQI	Air Quality Index
AQS	Air Quality System
BACM	Best Available Control Measures
BAM 1020	Beta Attenuation Monitor Model 1020
BLM	United States Bureau of Land Management
BP	United States Border Patrol
CAA	Clean Air Act
CARB	California Air Resources Board
CMP	Conservation Management Practice
DCP	Dust Control Plan
DPR	California Department of Parks and Recreation
EER	Exceptional Events Rule
EPA	Environmental Protection Agency
FEM	Federal Equivalent Method
FRM	Federal Reference Method
GOES-W/E	Geostationary Operational Environmental Satellite (West/East)
HC	Historical Concentrations
HYSPLIT	Hybrid Single Particle Lagrangian Integrated Trajectory Model
ICAPCD	Imperial County Air Pollution Control District
INPEE	Initial Notification of a Potential Exceptional Event
ITCZ	Inter Tropical Convergence Zone
KBLH	Blythe Airport
KCZZ	Campo Airport
KIPL	Imperial County Airport
KNJK	El Centro Naval Air Station
KNYL/MCAS	Yuma Marine Corps Air Station
KPSP	Palm Springs International Airport
KTRM	Jacqueline Cochran Regional Airport (aka Desert Resorts Rgnl Airport)
PST	Local Standard Time
MMML/MXL	Mexicali, Mexico Airport
MODIS	Moderate Resolution Imaging Spectroradiometer
MPH	Miles Per Hour
MST	Mountain Standard Time
NAAQS	National Ambient Air Quality Standard
NCAR	National Center for Atmospheric Research
NCEI	National Centers for Environmental Information
NEAP	Natural Events Action Plan
NEXRAD	Next-Generation Radar
NOAA	National Oceanic and Atmospheric Administration

nRCP	Not Reasonably Controllable or Preventable
NWS	National Weather Service
PDT	Pacific Daylight Time
PM_{10}	Particulate Matter less than 10 microns
$PM_{2.5}$	Particulate Matter less than 2.5 microns
PST	Pacific Standard Time
QA/QC	Quality Assured and Quality Controlled
QCLCD	Quality Controlled Local Climatology Data
RACM	Reasonable Available Control Measure
RAWS	Remote Automated Weather Station
SIP	State Implementation Plan
SLAMS	State Local Ambient Air Monitoring Station
SMP	Smoke Management Plan
SSI	Size-Selective Inlet
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
UTC	Coordinated Universal Time
WRCC	Western Regional Climate Center

I Introduction

On October 30, 2016, State and Local Ambient Air Monitoring Stations (SLAMS), located in Brawley (AQS Site Code 06-025-0007), California, measured an exceedance of the National Ambient Air Quality Standard (NAAQS). The Federal Equivalent Method (FEM), Beta Attenuation Monitors Model 1020 (BAM 1020) measured a (midnight to midnight) 24-hr average Particulate Matter less than 10 microns (PM_{10}) concentration of 162 µg/m^3 (**Table 1-1**). PM_{10} 24-hr measurements above 150 µg/m^3 are exceedances of the NAAQS. Brawley was the only monitor to measure an exceedance of the PM_{10} NAAQS on October 30, 2016.

TABLE 1-1
CONCENTRATIONS OF PM_{10} ON OCTOBER 30, 2016

DATE	MONITORING SITE	AQS ID	POC(s)	HOURS	24-HOUR CONCENTRATION µg/m^3	PM_{10} NAAQS µg/m^3
10/30/2016	**Brawley**	**06-025-0007**	**3**	**24**	**162**	**150**
10/30/2016	Calexico	06-025-0005	3	24	62	150
10/30/2016	El Centro	06-025-1003	4	24	79	150
10/30/2016	Niland	06-025-4004	3	24	58	150
10/30/2016	Westmorland	06-025-4003	3	24	124	150

*All time referenced throughout this document is in Pacific Standard Time (PST) unless otherwise noted[1]

The Imperial County Air Pollution Control District (ICAPCD) has been submitting PM_{10} data from FRM SSI instruments since 1986 into the United States Environmental Protection Agency's (USEPA) Air Quality System (AQS). Prior to 2013 all continuous measured PM_{10} data was non-regulatory, thus measured in local conditions. However, by 2013 ICAPCD began formally submitting continuous FEM PM_{10} data from BAM 1020's into the USEPA managed AQS. Because regulatory consideration of reported data must be in standard conditions, as required by USEPA, all continuous PM_{10} data since 2013 is regulatory. On October 30, 2016, the Brawley monitor was impacted by elevated particulate matter caused by the entrainment of fugitive windblown dust from high winds associated with a low-pressure system that moved through southern California during October 30, 2016.

This report demonstrates that the exceedances observed on October 30, 2016 were caused by a naturally occurring event which elevated particulate matter which affected air quality, which has concentration to concentration monitoring site analyses supporting the clear causal relationship between the event and the monitored exceedances, was not reasonably controllable

[1] According to the National Institute of Standards and Technology (NIST) Time and Frequency Division the designation of the time of day for specific time zones are qualified by using the term "standard time" or "daylight time". For year-round use the designation can be left off inferring "local time" daylight or standard whichever is present. For 2015 Pacific Daylight Time (PDT) is March 13 through November 6. https://www.nist.gov/pml/time-and-frequency-division/local-time-faqs#intl

or preventable (nRCP), and would not have occurred without the entrainment of fugitive windblown dust from outlying deserts and mountains within the Sonoran Desert to the west of Imperial County. The document further substantiates the request by the ICAPCD to exclude PM_{10} 24-hour NAAQS exceedance of 162 µg/m^3 (**Table 1-1**) as an exceptional event. This demonstration substantiates that this event meets the definition of the USEPA Regulation for the Treatment of Data Influenced by Exceptional Events (EER).[2]

I.1 Demonstration Contents

Section II - Describes the October 30, 2016 event as it occurred in California and into Imperial County, providing background information of the exceptional event and explaining how the wind driven emissions from the event led to the exceedance at the Brawley monitor.

Section III – Using time-series graphs, summaries and historical concentration comparisons of the Brawley station this section discusses and establishes how the October 30, 2016 event affected air quality such that a clear causal relationship is demonstrated between the event and the monitored exceedance. It is perhaps of some value to mention that the time-series graphs include PM_{10} data measured in both local conditions and standard conditions. Measured PM_{10} continuous data prior to 2013 is in local conditions, all other data is in standard conditions. The concentration difference between local and standard conditions has an insignificant impact on any data analysis. Overall, this section provides the evidence that human activity played little or no direct causal role in the October 30, 2016 event and its resulting emissions defining the event as a "natural event".[3]

Section IV - Provides evidence that the event of October 30, 2016 was not reasonably controllable or preventable despite the full enforcement and implementation of Best Available Control Measures (BACM).

Section V - Brings together the evidence presented within this report to show that the exceptional event affected air quality; that the event was not reasonably controllable or preventable; that there was a clear causal relationship between the event and the exceedance, and that the event was a natural event.

I.2 Requirement of the Exceptional Event Rule

The above sections combined comprise the technical requirements described under the Exceptional Events Rule (EER) under 40 CFR §50.14(c)(3)(iv). However, in order for the USEPA to concur with flagged air quality monitoring data, there are additional non-technical requirements.

[2] "Treatment of Data Influenced by Exceptional Events; Final Guidance", 81 FR 68216, October 2, 2016

[3] Title 40 Code of Federal Regulations part 50: §50.1(k) Natural event means an event and its resulting emissions, which may recur at the same location, in which human activity plays little or no direct causal role. For purposes of the definition of a natural event, anthropogenic sources that are reasonably controlled shall be considered to not play a direct role in causing emissions.

I.2.a Public Notification that a potential event was occurring (40 CFR §50.14(c)(1))

The ICAPCD and the National Weather Service (NWS) provided an extended week-to-weekend notification via the ICAPCD's webpage on Friday, October 28, 2016 explaining that a trough of low pressure would move through the region by Sunday, October 30, creating a strong onshore flow and gusty westerly winds across southeast California. A zone forecast for Imperial County forecasted west winds of 20 mph with gusts up to 30 mph by the afternoon. Imperial County actually saw higher winds. A wind advisory was issued that included the San Diego County desert slopes and deserts. Winds were forecasted to reach 25 mph with gusts up to 35 mph. Blowing dust and blowing sand were expected. This area was largely upstream of Imperial County during the wind event. Due to the potential for suspended particles and poor air quality, the ICAPCD issued a "No Burn" day advisory for Imperial County October 30. The ICAPCD posted on its website an air quality forecast that advised gusty westerly winds during the afternoon and evening would lead to areas of blowing dust. **Appendix A** contains copies of notices as they were issued either as forecast information prior to or on October 30, 2016.

I.2.b Initial Notification of Potential Exceptional Event (INPEE) (40 CFR §50.14(c)(2))

States are required under federal regulation to submit measured ambient air quality data into the AQS. AQS is the federal repository of Quality Assured and Quality Controlled (QA/QC) ambient air data used for regulatory purposes. When States intend to request the exclusion of one or more exceedances of a NAAQS as an exceptional event a notification to the Administrator is required. The notification is accomplished by flagging the data in AQS and providing an initial event description.

On October 3, 2016, the US EPA promulgated revisions to the Exceptional Events rule, which included the requirement of an "Initial Notification of Potential Exceptional Event" (INPEE) process. This revised INPEE process requires communication between the US EPA regional office and the State, prior to the development of a demonstration. The intent of the INPEE process is twofold: to determine whether identified data may affect a regulatory decision and whether a State should develop/submit an EE Demonstration.

The ICAPCD made a formal written request to the California Air Resources Board (CARB) to place preliminary flags on SLAMS measured PM_{10} concentrations from the Brawley, El Centro, and Westmorland monitors on April 17, 2017. The INPEE, for the October 30, 2016 event, was formally submitted by the CARB to USEPA Region 9 on April 24, 2017. Subsequently there after a second revised request was sent to CARB requesting preliminary flags on additional days during 2016. **Table 1-1** above provides the PM_{10} measured concentrations for all monitors in Imperial County for October 30, 2016. A brief description of the meteorological conditions was provided to CARB, which provided preliminary information that indicated a potential natural event had occurred on October 30, 2016.

I.2.c Documentation that the public comment process was followed for the event demonstration that was flagged for exclusion (40 CFR §50.14(c)(3)(v))

The ICAPCD posted, for a 30-day public review, a draft version of this demonstration on the ICAPCD webpage and published a notice of availability in the Imperial Valley Press on August 17, 2018. The notice advised the public that comments were being solicited regarding this demonstration, which supports the request, by the ICAPCD, to exclude the measured concentrations of 162 $\mu g/m^3$, which occurred on October 30, 2016 in Brawley (**Table 1-1**). The final closing date for comments was September 17, 2018. **Appendix A** contains a copy of the public notice affidavit along with any comments received by the ICAPCD for submittal as part of the demonstration (40 CFR §50.14(c)(3)(v)).

I.2.d Documentation submittal supporting an Exceptional Event Flag (40 CFR §50.14(c)(3)(i))

States that have flagged data as a result of an exceptional event and who have requested an exclusion of said flagged data are required to submit a demonstration that justifies the data exclusion to the USEPA in accordance with the due date established by USEPA during the INPEE process (40 CFR §50.14(c)(2)). Currently, bi-weekly meetings between USEPA, CARB and Imperial County are set to discuss each flagged exceedance for 2016.

The ICAPCD, after the close of the comment period and after consideration of the comments will submit this demonstration along with all required elements, including received comments and responses to USEPA Region 9 in San Francisco, California. The submittal of the October 30, 2016 demonstration will have a regulatory impact upon the development and ultimate submittal of the PM_{10} State Implementation Plan for Imperial County in 2018.

I.2.e Necessary demonstration to justify an exclusion of data under (40 CFR§50.14(c)(3)(iv))

A This demonstration provides evidence that the event, as it occurred on October 30, 2016, satisfies the definition in 40 CFR §50.1(j) and (k) for an exceptional event.

- a The event created the meteorological conditions that entrained emissions and caused the exceedance.
- b The event clearly "affects air quality" such that there is the existence of a clear causal relationship between the event and the exceedance.
- c Analysis demonstrates that the event-influenced concentrations compared to concentrations at the same monitor at other times supports the clear causal relationship.
- d The event "is not reasonably controllable and not reasonably preventable."
- e The event is "caused by human activity that is unlikely to recur at a particular location or [is] a natural event."
- f The event is a "natural event" where human activity played little or no direct causal role.

B This demonstration provides evidence that the exceptional event affected air quality in Imperial County by demonstrating a clear causal relationship between the event and the measured concentrations in Brawley.

C This demonstration provides evidence of the measured concentrations to concentrations at the same monitor at other times supporting the clear causal relationship between the event and the affected monitor.

II October 30, 2016 Conceptual Model

This section provides a summary description of the meteorological and air quality conditions under which the October 30, 2016 event unfolded in Imperial County. The subsection elements include

» A description and map of the geographic setting of the air quality and meteorological monitors
» A description of Imperial County's climate
» An overall description of meteorological and air quality conditions on the event day.

II.1 Geographic Setting and Monitor Locations

According to the United States Census Bureau, Imperial County has a total area of 4,482 square miles of which 4,177 square miles is land and 305 square miles is water. Much of Imperial County is below sea level and is part of the Colorado Desert an extension of the larger Sonoran Desert (**Figure 2-1)**.The Colorado Desert not only in includes Imperial County but a portion of San Diego County.

FIGURE 2-1
COLORADO DESERT AREA IMPERIAL COUNTY

Fig 2-1: 1997 California Environmental Resources Evaluation System. According to the United States Geological Survey (USGS) Western Ecological Research Center the Colorado Desert bioregion is part of the bigger Sonoran Desert Bioregion which includes the Colorado Desert and Upper Sonoran Desert sections of California and Arizona, and a portion of the Chihuahuan Basin and Range Section in Arizona and New Mexico (Forest Service 1994)

A notable feature in Imperial County is the Salton Sea, which is at approximately 235 feet below sea level. The Chocolate Mountains are located east of the Salton Sea and extend in a northwest-southeast direction for approximately 60 miles (**Figure 2-2)**. In this region, the geology is dominated by the transition of the tectonic plate boundary from rift to fault. The southernmost strands of the San Andreas Fault connect the northern-most extensions of the East Pacific rise. Consequently, the region is subject to earthquakes and the crust is being stretched, resulting in a sinking of the terrain over time.

FIGURE 2-2
SURROUNDING AREAS OF THE SALTON SEA

Fig 2-2: Image courtesy of the Image Science and Analysis Laboratory NASA Johnson Space Center, Houston Texas

All of the seven incorporated cities, including the unincorporated township of Niland, are surrounded by agricultural fields to the north, east, west and south (**Figure 2-6)**. Together, the incorporated cities, including Niland, and the agricultural fields make what is known as the Imperial Valley. Surrounding the Imperial Valley are desert areas found on the eastern and western portions of Imperial County.

The desert area, found within the western portion of Imperial County is of note because of its border with San Diego County. From west to east, San Diego County stretches from the Pacific Ocean to its boundary with Imperial County. San Diego County has a varied topography. On its western side is 70 miles (110 km) of coastline. Most of San Diego between the coast and the Laguna Mountains consists of hills, mesas, and small canyons. Snow-capped (in winter) mountains rise to the northeast, with the Sonoran Desert to the far east. Cleveland National Forest is spread across the central portion of the county, while the Anza-Borrego Desert State Park occupies most of the northeast. The southeastern portion of San Diego County is comprised of distinctive Peninsular mountain ranges. The mountains and deserts of San Diego comprise the eastern two-thirds of San Diego County and are primarily undeveloped back county with a native plant community known as chaparral. Of the nine major mountain ranges within San Diego County, the In-Ko-Pah Mountains and the Jacumba Mountains border Mexico and Imperial County.

Both mountain ranges provide the distinctive weathered dramatic piles of residual boulders that can be seen while driving Interstate 8 from Imperial County through Devil's Canyon and In-Ko-Pah Gorge. Interstate 8 runs along the US border with Mexico from San Diego's Mission Bay to just southeast of Casa Grande Arizona.

FIGURE 2-3
JACUMBA PEAK

Fig 2-3: The Jacumba Mountains reach an elevation of 4,512 feet (1,375 m) at Jacumba Peak, near the southern end of the chain. Source: Wikipedia at https://en.wikipedia.org/wiki/Jacumba_Mountains

Northwest and northeast of the Jacumba Mountains is the Tierra Blanca Mountains, the Sawtooth Mountains and Anza-Borrego Desert State Park. Within the mountain ranges and the Anza-Borrego Desert State Park, there exists the Vallecito Mountains, the Carrizo Badlands, the Carrizo Impact Area, Coyote Mountains and the Volcanic Hills to name of few. Characteristically, these areas all have erosion that has occurred over time that extends from the Santa Rosa Mountains into northern Baja California in Mexico. For example, the Coyote Mountains consists of sand dunes left over from the ancient inland Sea of Cortez. Much of the terrain is still loose dirt, interspersed with sandstone and occasional quartz veins. The nearest community to the Coyote Mountain range is the community of Ocotillo. Of interest are the fossilized and hollowed out sand dunes that produce wind caves.

FIGURE 2-4
ANZA-BORREGO DESERT STATE PARK
CARRIZO BADLANDS

Fig 2-4: View southwest across the Carrizo Badlands from the Wind Caves in Anza-Borrego Desert State Park. Source: Wikipedia at https://en.wikipedia.org/wiki/Carrizo_Badlands

The Carrizo Badlands, which includes the Carrizo Impact Area used by the US Navy as an air-to-ground bombing range during World War II and the Korean War, lies within the Anza-Borrego Desert State Park. The Anza-Borrego Desert State Park is located within the Colorado Desert, is the largest state park in California occupying eastern San Diego County, reaching into Imperial and Riverside counties. The two communities within Anza-Borrego Desert State Park are Borrego Springs and Shelter Valley.

The Anza-Borrego Desert State Park lies in a unique geologic setting along the western margin of the Salton Trough. The area extends north from the Gulf of California to San Gorgonio Pass and from the eastern rim of the Peninsular Ranges eastward to the San Andreas Fault zone along the far side of the Coachella Valley. The Anza-Borrego region changed gradually over time from intermittently being fed by the Colorado River Delta to dry lakes and erosion from the surrounding mountain ranges. The area located within the southeastern and northeastern section of San Diego County is a source of entrained fugitive dust emissions that impact Imperial County when westerly winds funnel through the unique landforms causing in some cases wind tunnels that cause increases in wind speeds.

Historical observations have indicated that the desert slopes and mountains of San Diego are a source of fugitive emissions along with those deserts located to the east and west of Imperial County, which extend into Mexico (Sonoran Desert, **Figure 2-7**). Combined, the desert areas and mountains of San Diego and the desert areas that extend into Mexico are sources of dust emissions, which affect the Imperial County during high wind events.

FIGURE 2-5
ANZA-BORREGO DESERT STATE PARK
DESERT VIEW FROM FONT'S POINT

Fig 2-5: Desert view from Font's Point. Source: Font's Point Anza-Borrego Photographed by and copyright of (c) David Corby; Wikipedia at https://en.wikipedia.org/wiki/Anza-Borrego_Desert_State_Park

FIGURE 2-6
LOCATION AND TOPOGRAPHY OF IMPERIAL COUNTY

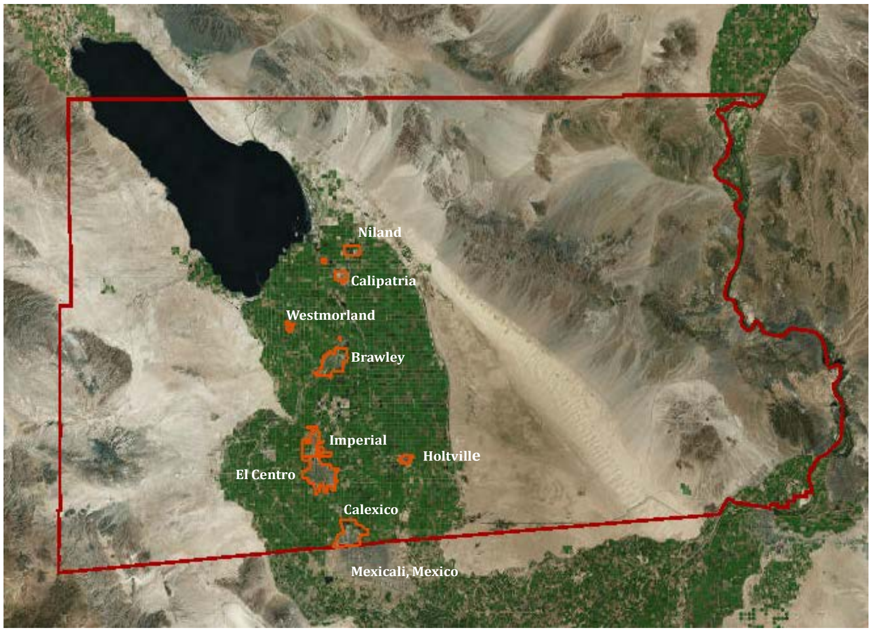

Fig 2-6: Depicts the seven incorporated cities within Imperial Valley - City of Calipatria, City of Westmorland, City of Brawley, City of Imperial, City of El Centro, City of Holtville, City of Calexico. Niland is unincorporated. Mexicali, Mexico is to the south.

FIGURE 2-7
DESERTS IN CALIFORNIA, YUMA AND MEXICO

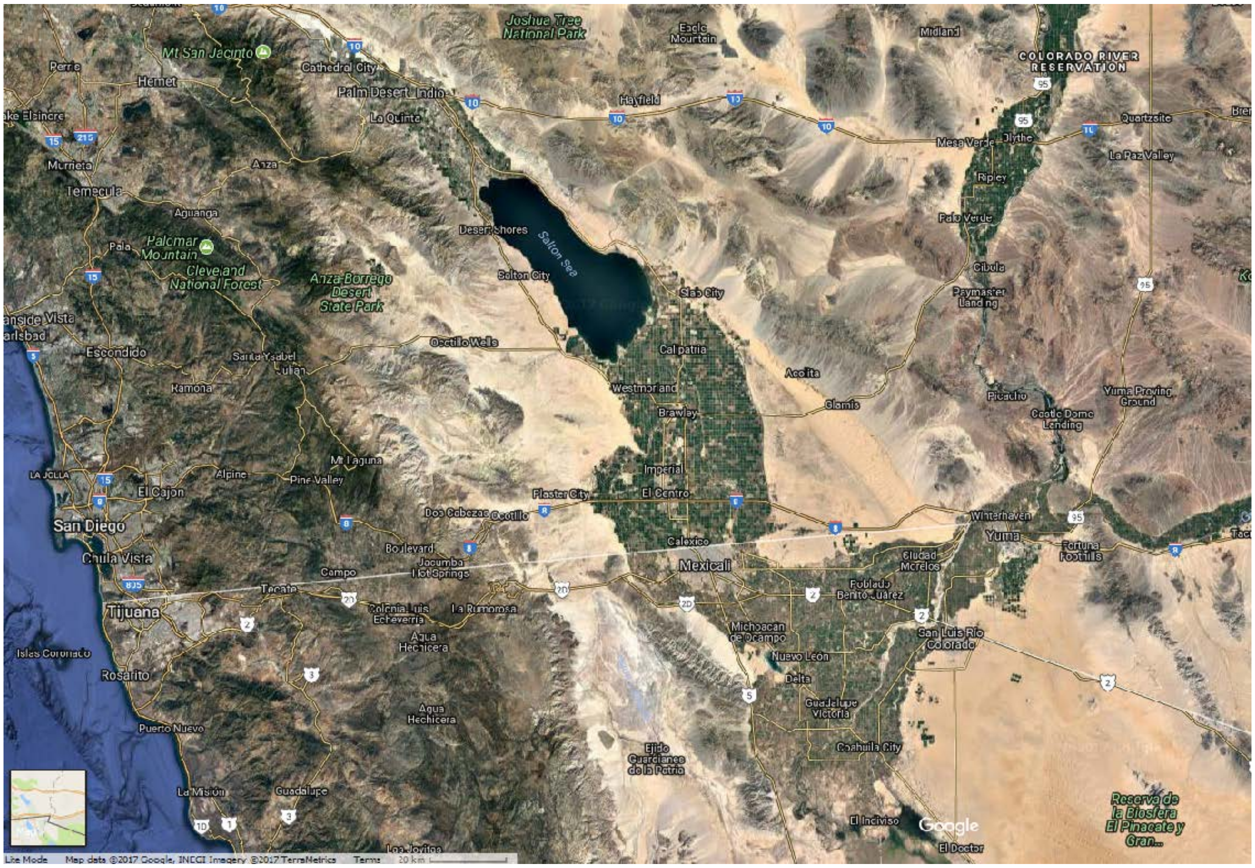

Fig 2-7: Depicts the Sonoran Desert as it extends from Mexico into Imperial County. Source: Google Earth Terra Matrices.

The air quality and meteorological monitoring stations used in this demonstration are shown in **Figure 2-8**. Of the five SLAMS within Imperial County four stations measure both meteorological and air quality data. These SLAMS are located in Calexico, El Centro, Westmorland, and Niland; the station located in Brawley only measures air quality. Other air monitoring stations measuring air quality and meteorological data used for this demonstration include stations in eastern Riverside County, southeastern San Diego County and southwestern Arizona (Yuma County) (**Figure 2-8 and Table 2-1)**.

As mentioned above, the PM_{10} exceedance on October 30, 2016, occurred at the Brawley station. The Brawley, Westmorland, and Niland stations are regarded as the "northern" monitoring sites within the Imperial County air monitoring network. In order to properly analyze the contributions from meteorological conditions occurring on October 30, 2016, other meteorological sites were used in this demonstration which include airports in eastern Riverside County, southeastern San Diego County, southwestern Arizona (Yuma County), Imperial County, and other sites relevant to the wind event, such as within northern Mexico. (**Figure 2-8 and Appendix B)**.

FIGURE 2-8
MONITORING SITES IN AND AROUND IMPERIAL COUNTY

Fig 2-8: Depicts a select group of PM_{10} monitoring sites in Imperial County, eastern Riverside County, and southwestern Arizona (Yuma County). Generated through Google Earth.

In addition to meteorological sites, there are non-regulatory PM_{10} sites located around the Salton Sea that maybe referenced as an aid to help the reader understand the direction and velocity of winds that affect Imperial County. Unless, otherwise specifically indicated concentration references do not imply emissions from the surrounding playa of the Salton Sea. Three sites, in specific, are the Salton City air monitoring station, the Naval Test Base air monitoring station and the Sonny Bono air monitoring station. These stations are privately owned and non-regulatory (**Figures 2-9 to 2-12**). The Salton City station is located 33.27275°N latitude and 115.90062˚W longitude, on the western edge of the Salton Sea (**Figure 2-9**). The station abuts a water reservoir along the Salton Sea with surrounding chaparral vegetation and unpaved open areas and roads. The Naval Test Base station is located 33.16923°N latitude and 115.85593˚W longitude, on the southwestern edge of the Salton Sea (**Figure 2-11**). The station sits on an abandoned US Military site, still owned by the Department of Defense. Unlike the Salton City station, light chaparral vegetation and sandy open dune areas surround the Naval Test Base station. Directly to the west of the station is an orchard. The Sonny Bono station is located 33.17638°N latitude and

115.62310˚W longitude, on the southern portion of the Salton Sea within the Sonny Bono Salton Sea Wildlife Refuge. The Sonny Bono Salton Sea National Wildlife Refuge is 40 miles north of the Mexican border at the southern end of the Salton Sea within the Sonoran Desert. The Refuge has two separate managed units, 18 miles apart. Each unit contains wetland habitats, farm fields, and tree rows. The land of the Salton Sea Refuge is flat, except for Rock Hill, a small, inactive volcano, located near Refuge Headquarters. Bordering the Refuge is the Salton Sea on the north and farmlands on the east, south, and west.

FIGURE 2-9
SALTON CITY AIR MONITORING STATION

Fig 2-9: Depicts the Salton City air monitoring (circled) site operated by a private entity. Site photos can be seen at the California Air Resources Board monitoring website at https://www.arb.ca.gov/qaweb/sitephotos.php?site_no=13604&date=17

FIGURE 2-10
SALTON CITY AIR MONITORING STATION
WEST

Fig 2-10: Photograph taken by the California Air Resources Board audit team in 2017. The photograph is taken from the west facing the probe. https://www.arb.ca.gov/qaweb/sitephotos.php?site_no=13604&date=17

FIGURE 2-11
NAVAL TEST BASE AIR MONITORING STATION

Fig 2-11: Depicts the Naval Test Base air monitoring (circled) site operated by a private entity. To view the site photos visit the California Air Resources Board monitoring website at https://www.arb.ca.gov/qaweb/sitephotos.php?site_no=13603&date=17

FIGURE 2-12
NAVAL TEST BASE AIR MONITORING STATION
WEST

Fig 2-12: Photograph taken by the California Air Resources Board audit team in 2017. The photograph is taken from the west facing the probe. https://www.arb.ca.gov/qaweb/sitephotos.php?site_no=13604&date=17

FIGURE 2-13
SONNY BONO AIR MONITORING STATION

Fig 2-13: Depicts the Sonny Bono air monitoring (circled) site operated by a private entity. To view the site photos visit the California Air Resources Board monitoring website at https://www.arb.ca.gov/qaweb/sitephotos.php?site_no=13604&date=17

FIGURE 2-14
SONNY BONO SALTON SEA NATIONAL WILDLIFE REFUGE

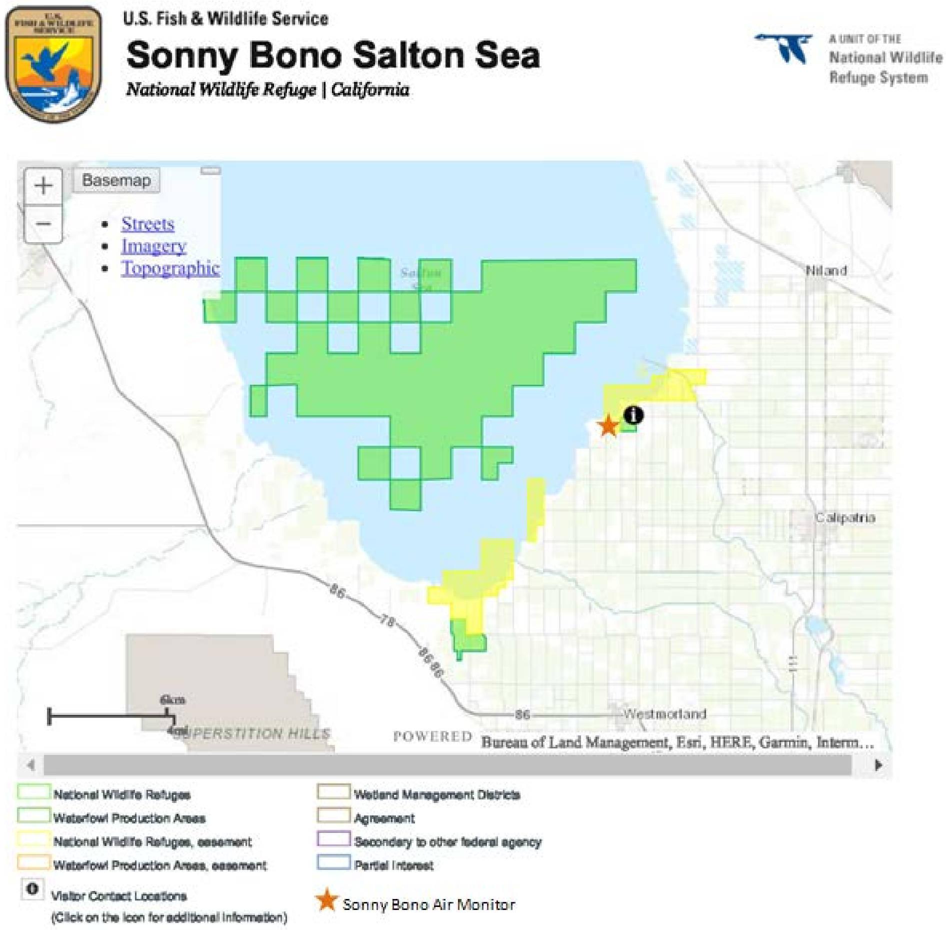

Fig 2-14: The Sonny Bono Wildlife Refuge has about 2,000 acres that are farmed and managed for wetlands. In 1998, the Refuge was renamed after Congressman Sonny Bono, who helped inform the U.S. Congress of the environmental issues facing the Salton Sea as well as acquiring funding for this Refuge to help it respond to avian disease outbreaks and other habitat challenges at the Salton Sea. Source: https://www.fws.gov/refuge/Sonny_Bono_Salton_Sea/about.html

TABLE 2-1
MONITORING SITES IN IMPERIAL COUNTY, RIVERSIDE COUNTY AND ARIZONA
OCTOBER 30, 2016

Monitor Site Name	*Operator	Monitor Type	AQS ID	AQS PARAMETER CODE	ARB Site Number	Elevation (meters)	24-hr PM_{10} ($\mu g/m^3$) Avg	1-hr PM_{10} ($\mu g/m^3$) Max	**Time of Max Reading	Max Wind Speed (mph)	**Time of Max Wind Speed
IMPERIAL COUNTY											
Brawley-Main Street #2	ICAPCD	Hi-Vol Gravimetric	06-025-0007	(81102)	13701	-15	-	-	-	-	-
		BAM 1020					162	824	18:00		
Calexico-Ethel Street	CARB	BAM 1020	06-025-0005	(81102)	13698	3	62	154	19:00	12.7	19:00
El Centro-9th Street	ICAPCD	BAM 1020	06-025-1003	(81102)	13694	9	79	451	21:00	13.4	20:00
Niland-English Road	ICAPCD	Hi-Vol Gravimetric	06-025-4004	(81102)	13997	-57	-	-	-	24.1	18:00
		BAM 1020					58	412	11:00		
Westmorland	ICAPCD	BAM 1020	06-025-4003	(81102)	13697	-43	124	529	10:00	15.1	18:00
RIVERSIDE COUNTY											
Palm Springs Fire Station	SCAQMD	TEOM	06-065-5001	(81102)	33137	174	13	0:00	14:00	13	14:00
Indio (Jackson St.)	SCAQMD	TEOM	06-065-2002	(81102)	33157	1	-	-	-	-	-
ARIZONA – YUMA											
Yuma Supersite	ADEQ	TEOM	04-027-8011	(81102)	N/A	60	37	174	19:00	-	-

*CARB = California Air Resources Board
*ICAPCD = Air Pollution Control District, Imperial County
*SCAQMD = South Coast Air Management Quality District
*ADEQ =Arizona Department of Environmental Quality

**Time represents the actual time/hour of the measurement in question according to the zone time (PST unless otherwise noted)

II.2 Climate

As mentioned above, Imperial County is part of the Colorado Desert, which is a subdivision of the larger Sonoran Desert (**Figure 2-15**) encompassing approximately 7 million acres (28,000 km^2). The desert area encompasses Imperial County and includes parts of San Diego County, Riverside County, and a small part of San Bernardino County.

FIGURE 2-15
SONORAN DESERT REGION

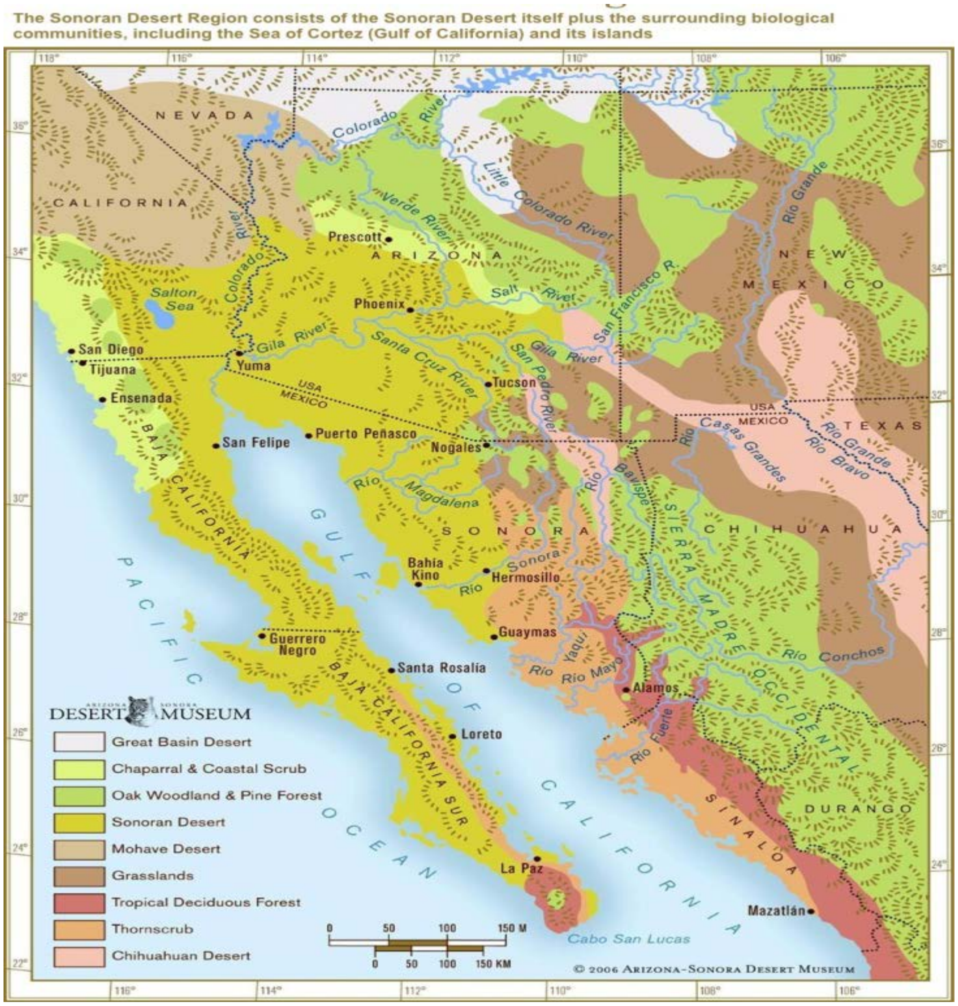

Fig 2-15: Depicts the magnitude of the region known as the Sonoran Desert. Source: Arizona-Sonora Desert Museum at http://desertmuseum.org/center/map.php

The majority of the Colorado Desert lies at a relatively low elevation, below 1,000 feet (300 m), with the lowest point of the desert floor at 275 feet (84 m) below sea level at the Salton Sea. Although the highest peaks of the Peninsular Range reach elevations of nearly 10,000 feet (3,000 m), most of the region's mountains do not exceed 3,000 feet (910 m).

In the Colorado Desert (Imperial County), the geology is dominated by the transition of the tectonic plate boundary from rift to fault. The southernmost strands of the San Andreas Fault connect to the northern-most extensions of the East Pacific Rise. Consequently, the region is subject to earthquakes, and the crust is being stretched, resulting in a sinking of the terrain over time.

The Colorado Desert's climate distinguishes it from other deserts. The region experiences greater summer daytime temperatures than higher-elevation deserts and almost never experiences frost. In addition, the Colorado Desert experiences two rainy seasons per year (in the winter and late summer), especially toward the southern portion of the region which includes a portion of San Diego County. The Colorado Desert portion of San Diego County receives the least amount of precipitation. Borrego Springs, the largest population center within the San Diego desert region averages 5 inches of rain with a high evaporation rate. By contrast, the more northerly Mojave Desert usually has only winter rains. The west coast Peninsular Ranges, or other west ranges, of Southern California–northern Baja California, block most eastern Pacific coastal air and rains, producing an arid climate. Other short or longer-term weather events can move in from the Gulf of California to the south, and are often active in the summer monsoons. These include remnants of Pacific hurricanes, storms from the southern tropical jet stream, and the northern Inter Tropical Convergence Zone (ITCZ).

The arid nature of the region is demonstrated when historic annual average precipitation levels in Imperial County average 2.64" (**Figure 2-16)**. During the 12-month period prior to the October 30, 2016 event, Imperial County measured a total annual precipitation of 1.02 inches. Such arid conditions, as those preceding the event, result in soils that are particularly susceptible to particulate suspension by the elevated gusty winds.

FIGURE 2-16
IMPERIAL COUNTY HISTORICAL WEATHER

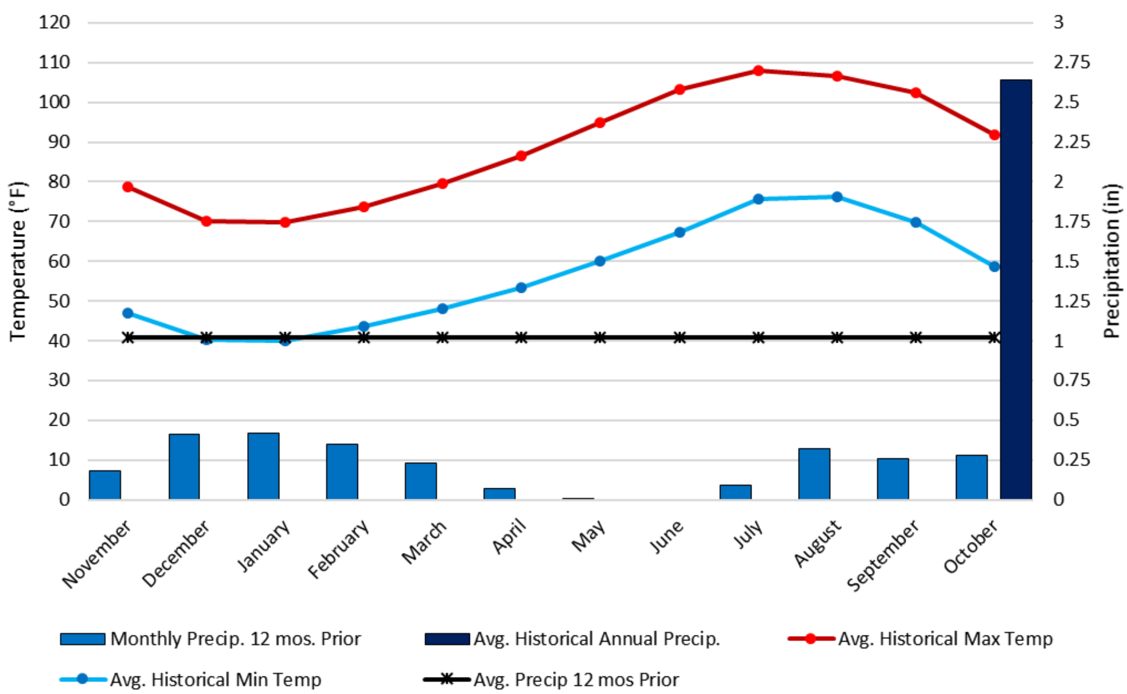

Fig 2-16: Historical Imperial County weather. In the 12 months prior to October 30, 2016, the region had suffered abnormally low total precipitation of 1.02 inches. Average annual precipitation is 2.64 inches (1932-present). Meteorological data courtesy of Western Regional Climate Center (WRCC) and Weather Underground http://www.wrcc.dri.edu/cgi-bin/climain.pl?ca2713

The NWS explains that the speed of any wind resulting from a weather system is directly proportional to the change in air pressure, called a pressure gradient, such that when the pressure gradient increases so does the speed of the wind.[4] Because the pressure gradient is just the difference in pressure between high and low pressure areas, changes in weather patterns may recur seasonally.

Typically, high pressure brings clear skies and with no clouds, there is more incoming shortwave solar radiation causing temperatures to rise. When surface winds become light, the cooling of the air produced directly under a high-pressure system can lead to a buildup of particulates in urban areas under an elongated region of relatively high atmospheric pressure or ridge causing widespread haze. Conversely, a trough is an elongated region of relatively low atmospheric pressure often associated with fronts. Troughs may be at the surface, or aloft under various conditions. Most troughs bring clouds, showers, and a wind shift, particularly following the passage of the trough.

While windblown dust events in Imperial County during the summer monsoon season are often due to outflow winds from thunderstorms, windblown dust events in the fall, winter, and spring are usually due to strong winds associated with low-pressure systems and cold fronts moving southeast across California. These winds are the result of strong surface pressure gradients between the approaching low-pressure system, accompanying cold front, and higher pressure ahead of it. As the low-pressure system and cold front approaches and passes, gusty southwesterly winds typically shift to northwesterly causing variable west winds. These strong winds entrain dust into the atmosphere and transport it over long distances, especially when soils are arid.

II.3 Event Day Summary

The exceptional event for Sunday, October 30, 2016 which was caused by a large trough moved over central California. This tightened the surface gradient leading to a strong onshore flow. High winds and gusts swept across the mountains and deserts of southeastern California. On October 30, 2016 strong westerly winds blew across southeastern California as the system moved through the region affecting air quality and causing an exceedance at the Brawley monitor.

Figures 2-17 through 2-19 provide information regarding the expected movement of the low pressure system and the subsequent tightening of the surface gradient over southeast California.

[4] NWS Jet Stream – Origin of Wind http://www.srh.noaa.gov/jetstream/synoptic/wind.html

FIGURE 2-17
UPPER LEVEL LOW MOVES OVER CALIFORNIA

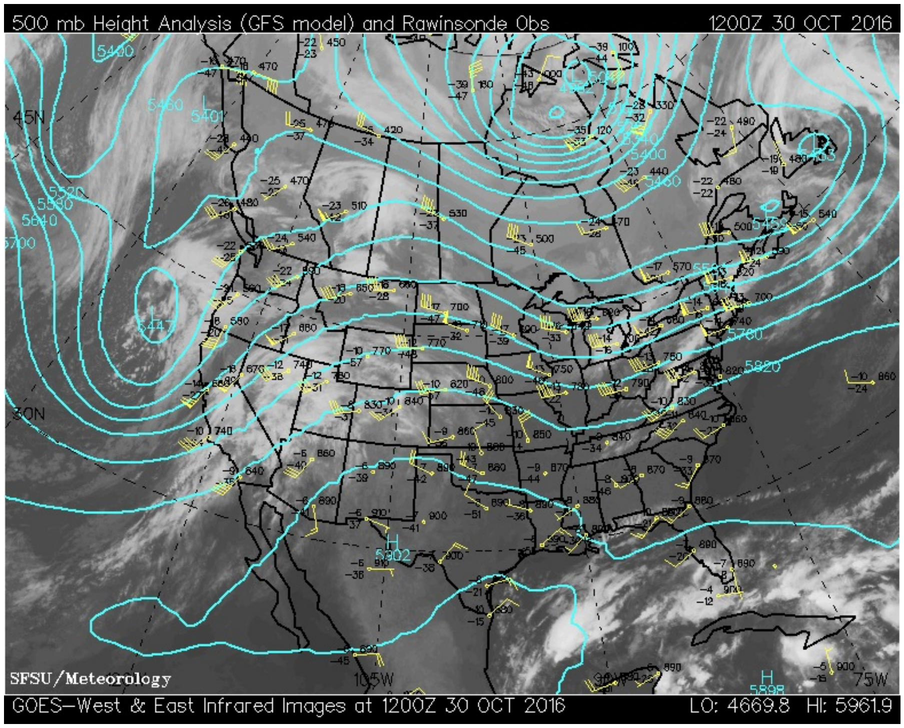

Fig 2-17: A GOES E-W infrared satellite 500mb height analysis image at 0400 LST on October 30 showing the low off the California coast. As the trough moved over central California it led to a tightening of the surface gradient. Source: SFSU University Department of Earth & Climate Sciences and the California Regional Weather Server; http://virga.sfsu.edu/archive/composites/sathts_snd/1610

FIGURE 2-18
SURFACE GRADIENT TIGHTENS OVER SOUTHERN CALIFORNIA

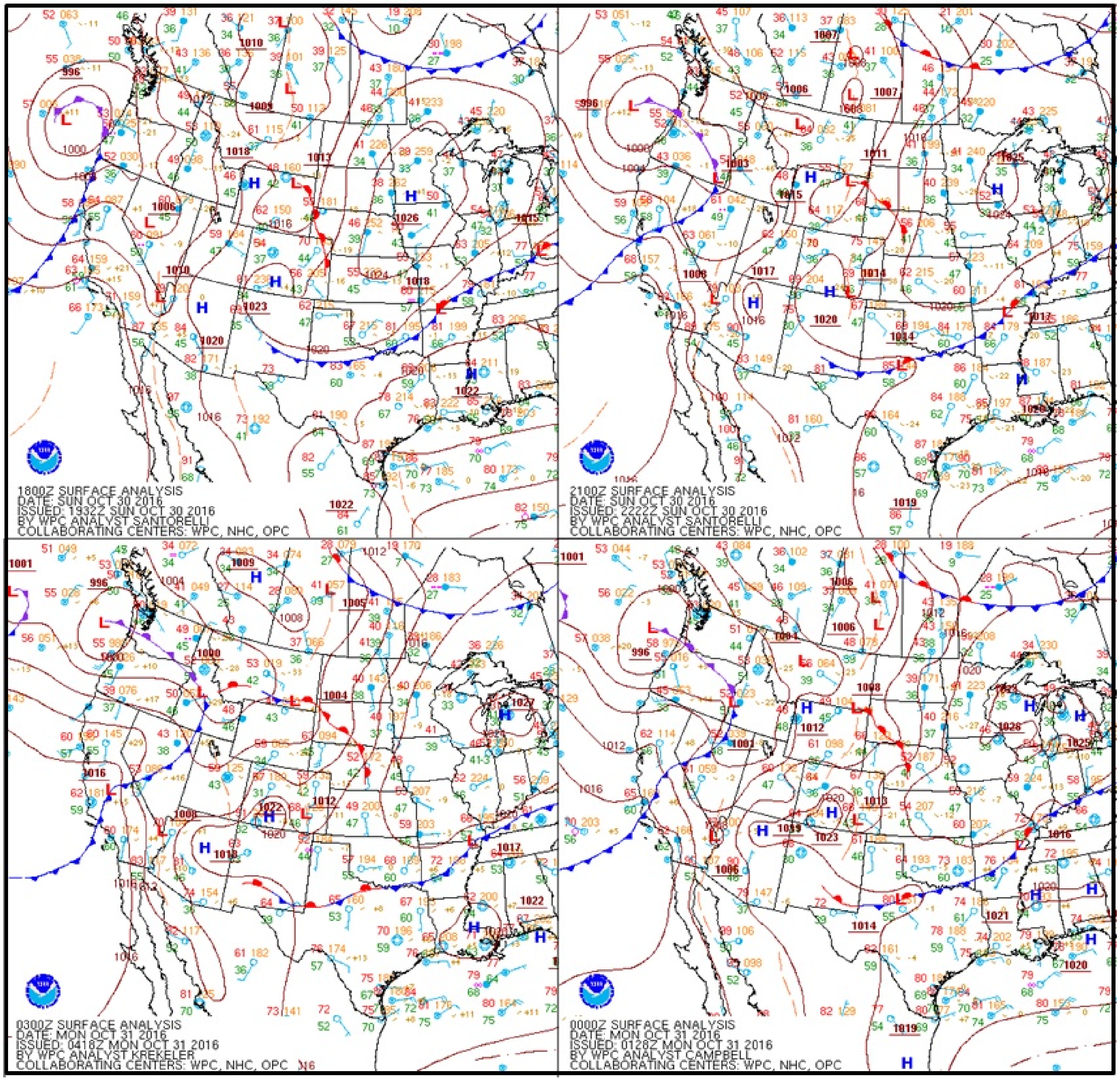

Fig 2-18: A quad of Surface Analysis Maps images showing the low digging southward from southern Nevada into California (top left) and the approach of a cold front associated with the weather system. At the same time the surface gradient tightened which led to a moderately strong onshore flow across the region and the gusty winds that swept through Imperial County on October 30, 2016. Clockwise from top left: 1000; 13000; 1600; 1900 LST on October 30, 2016. Source: WPC Surface Analysis Archive

FIGURE 2-19
HIGH WINDS ACROSS IMPERIAL COUNTY

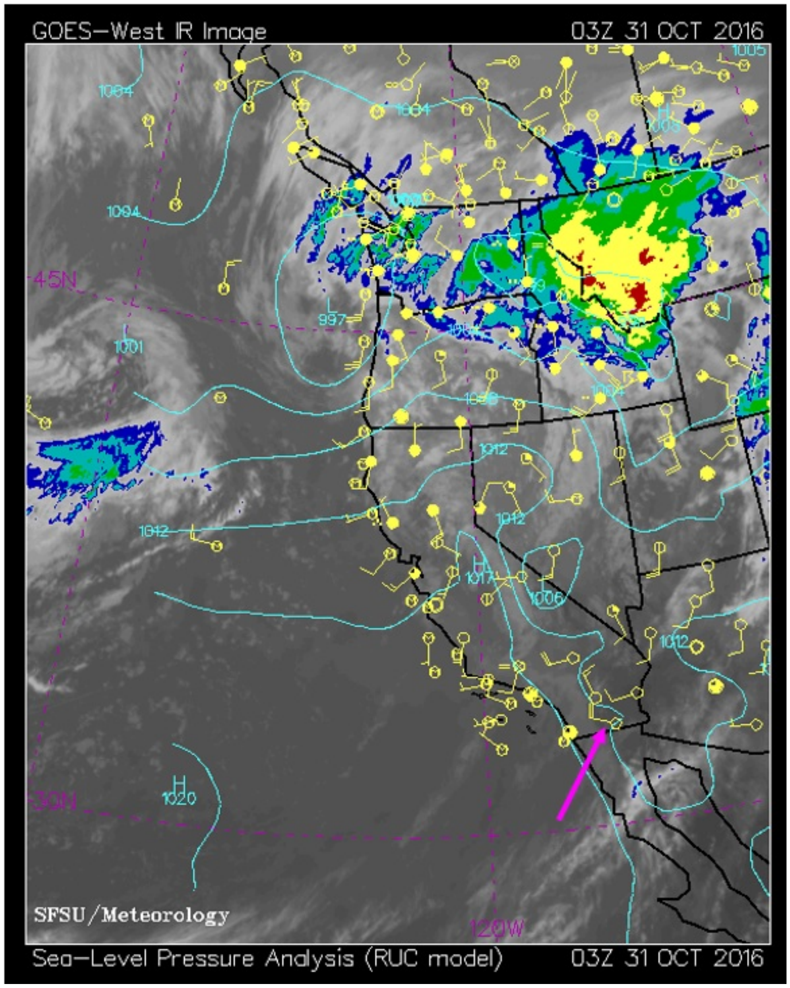

Fig 2-19: A wind barb at KNJK depicts WNW of at least 23 mph. In actuality winds were much higher. The image is for 1900 LST on October 30, 2016. During this hour winds of 30 mph were reported at KNJK. Imperial County was struck by WNW winds up to 30 mph with gusts reaching 37 mph. Figure 2-10 is a GOES-W satellite image at 1900 LST on October 30, 2016 that shows a wind barb at KNJK in Imperial County depicting WNW winds of at least 23 mph. In actuality the airfield received three hours of winds above the 25mph threshold. At 1956 LST the airfield reported winds of 30 mph and gusts of 37 mph. Source: SFSU Department of Earth and Climate Science and the California Regional Weather Server; http://squall.sfsu.edu/crws/archive/wcsathts_arch.html

Figure 2-20 is a graphical illustration of the chain of events for October 30, 2016. Based on meteorological data from El Centro NAF (KNJK) and Imperial County Airport (KIPL), winds were largely variable during the early hours of October 30, 2016. By early afternoon winds shifted solidly WNW. Winds and gusts continued to increase into the evening when winds peaked at 30 mph with gusts of 37 mph. In all, KNJK reported three hours of winds above the 25mph threshold. PM_{10} concentrations at Brawley spiked briefly at 1100 PST due to the increase in mid-morning winds. Hourly concentrations then dipped before rising to 177 µg/m^3 at 1500 and peaking at 1800 in response to high winds.

FIGURE 2-20
RAMP-UP TO EXCEEDANCE – OCTOBER 30, 2016

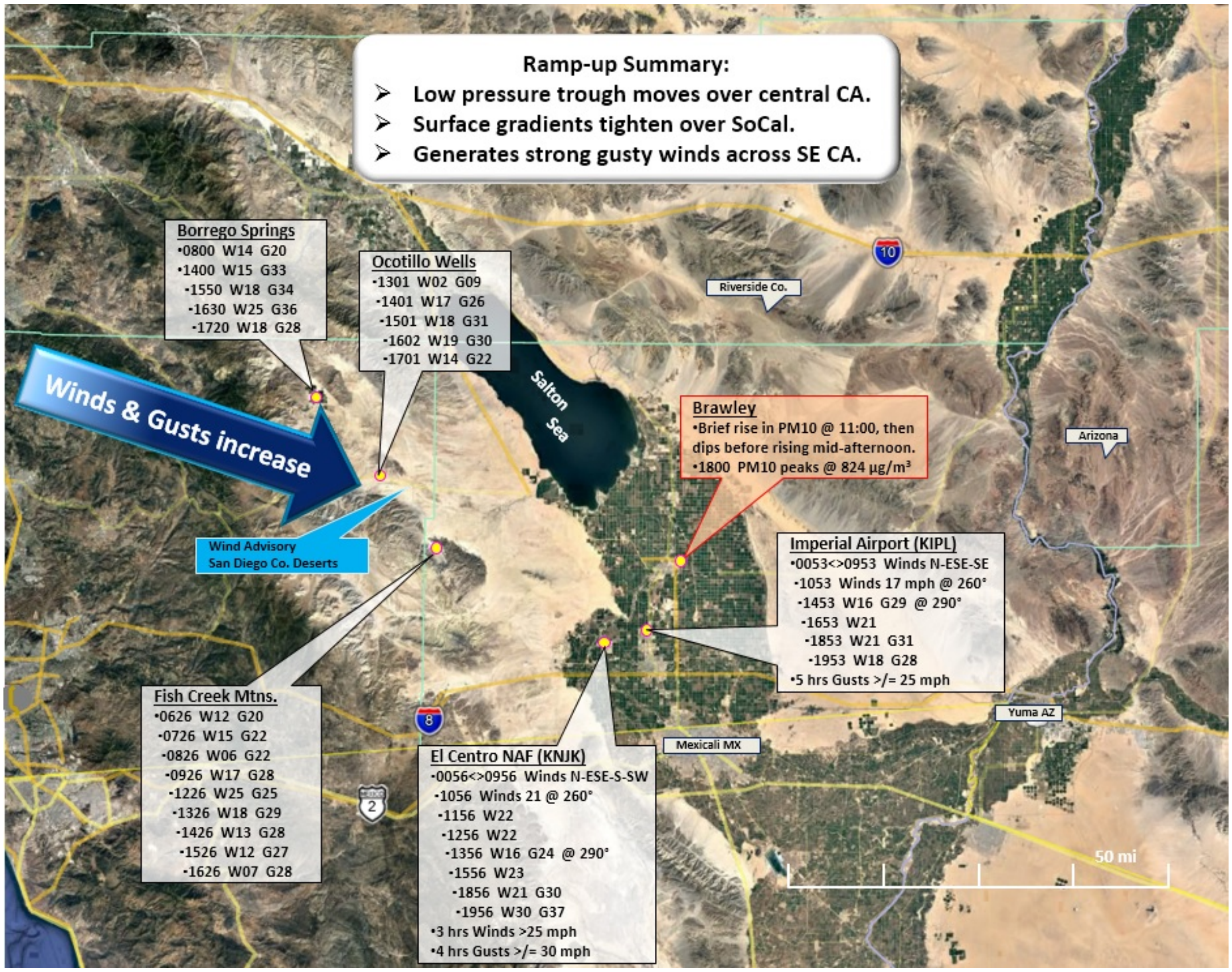

Fig 2-20: A trough dropping over central California tightened the surface gradient leading to gusty winds across southeast California. As the system moved in winds shifted WNW while increasing. By 1800 PST the Brawley FEM monitor reached a 24-hour hourly maximum. Google Earth base map

Table 2-2 contains a summary of maximum winds, peak wind gusts, and wind direction at monitors in Imperial County, eastern Riverside County, Yuma County, Arizona, and Mexicali. For detailed meteorological station, graphs see **Appendix B**.

TABLE 2-2

WIND SPEEDS ON OCTOBER 30, 2016

Station Monitor Airport Meteorological Data	Maximum Wind Speed (WS) (mph)	Wind Direction during Max WS (degrees)	Time of Max Wind Speed	24 hr Maximum Wind Gust (WG) (mph)	Time of Max WG	Brly	Wstmld
IMPERIAL COUNTY							
Imperial Airport (KIPL)	24	290	21:53	30	21:53	163	37
Naval Air Facility (KNJK)	30	290	19:56	37	19:56	647	107
Calexico (Ethel St)	12.7	306	19:00	-	-	647	107
El Centro (9th Street)	13.4	286	20:00	-	-	378	94
Niland (English Rd)	24.2	272	18:00	-	-	824	367
Westmorland	15.1	289	18:00	-	-	824	367
RIVERSIDE COUNTY							
Blythe Airport (KBLH)	18	260	14:52	23	13:37	70	112
Palm Springs Airport (KPSP)	22	340	20:53	33	14:53	378	94
Jacqueline Cochran Regional Airport (KTRM) - Thermal	20	330	16:52	29	16:52	121	201
ARIZONA - YUMA							
Yuma MCAS (KNYL)	13	180	09:57	21	22:57	20	28
MEXICALI - MEXICO							
Mexicali Int. Airport (MXL)	16.1	330	18:41	-	-	824	367

The National Oceanic and Atmospheric Administration (NOAA) Air Resources Laboratory HYSPLIT back trajectory model,[5] depicted in **Figure 2-21**, indicate the path of the airflow as it approached Brawley in the 12 hours leading up to the hour of peak concentration at 1800 PST.

The air parcel at the 10m and 100m level (red and blue trajectories) approached from the west-northwest, while upper level air (green trajectory) was more westerly. The HYSPLIT indicates that air was at surface level for almost two hours before reaching the monitor allowing for windblown dust. Data used in the HYSPLIT model has a horizontal resolution of 12 km and is integrated every three hours. Thus, the HYSPLIT model can differ from local observed surface wind directions.

[5] The Hybrid Single Particle Lagrangian Integrated Trajectory Model (**HYSPLIT**) is a computer model that is a complete system for computing simple air parcel trajectories to complex dispersion and deposition simulations. It is currently used to compute air parcel trajectories and dispersion or deposition of atmospheric pollutants. One popular use of HYSPLIT is to establish whether high levels of air pollution at one location are caused by transport of air contaminants from another location. HYSPLIT's back trajectories, combined with satellite images (for example, from NASA's MODIS satellites), can provide insight into whether high air pollution levels are caused by local air pollution sources or whether an air pollution problem was blown in on the wind The initial development was a result of a joint effort between NOAA and Australia's Bureau of Meteorology. Source: NOAA/Air Resources Laboratory, 2011.

FIGURE 2-21
HYSPLIT BACK-TRAJECTORY MODELS

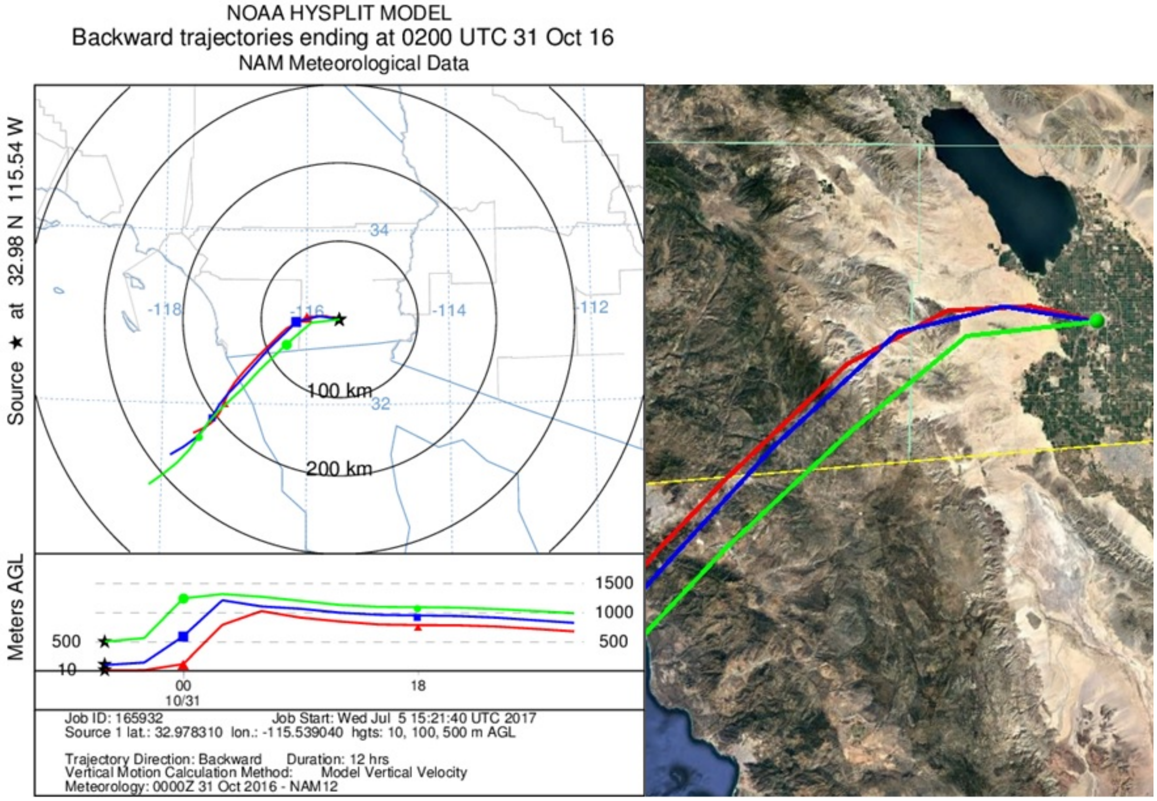

Fig 2-21: A 12-hour back-trajectory ending at Brawley at 1800 PST on October 30, 2016. This was the hour that the FEM monitor was measuring peak concentrations. Red trajectory indicates air flow at 10 meters AGL (above ground level); blue indicates air flow at 100 m; green indicates air flow at 500m. Yellow line indicates the international border. Aqua lines denote county boundaries. Dynamically generated through NOAA's Air Resources Laboratory HYSPLIT model. Base map from Google Earth

Figures 2-22 and 2-23 illustrate the wind speeds and elevated levels of hourly PM_{10} concentrations measured in Riverside, Imperial, and Yuma counties for the day before and the day of and after October 30, 2016. Elevated emissions were entrained into Imperial County affecting the Brawley monitor by gusty westerly winds associated with a strong low pressure system moving through the region. The Brawley monitor measured the highest elevated concentrations 100 through 1200 and again 1500 through 2100 on October 30, 2016 coincident with measured wind speeds and gust above 25mph (see **Fig. 2-24**).

The resulting entrained dust and accompanying high winds from the system qualify this event as a "high wind dust event".[6] High wind dust events are considered natural events where the

[6] Title 40 Code of Federal Regulations part 50: §50.1(p) High wind dust event is an event that includes the high-speed wind and the dust that the wind entrains and transports to a monitoring site.

windblown dust is either from solely a natural source or from areas where anthropogenic sources of windblown dust are controlled with Best Available Control Measures (BACM). The following sections provide evidence that the October 30, 2016 high wind event qualifies as a natural event and that BACM was overwhelmed by the suddenness and intensity of the meteorological event.

FIGURE 2-22
72-HOUR WIND SPEEDS AT REGIONAL AIRFIELDS

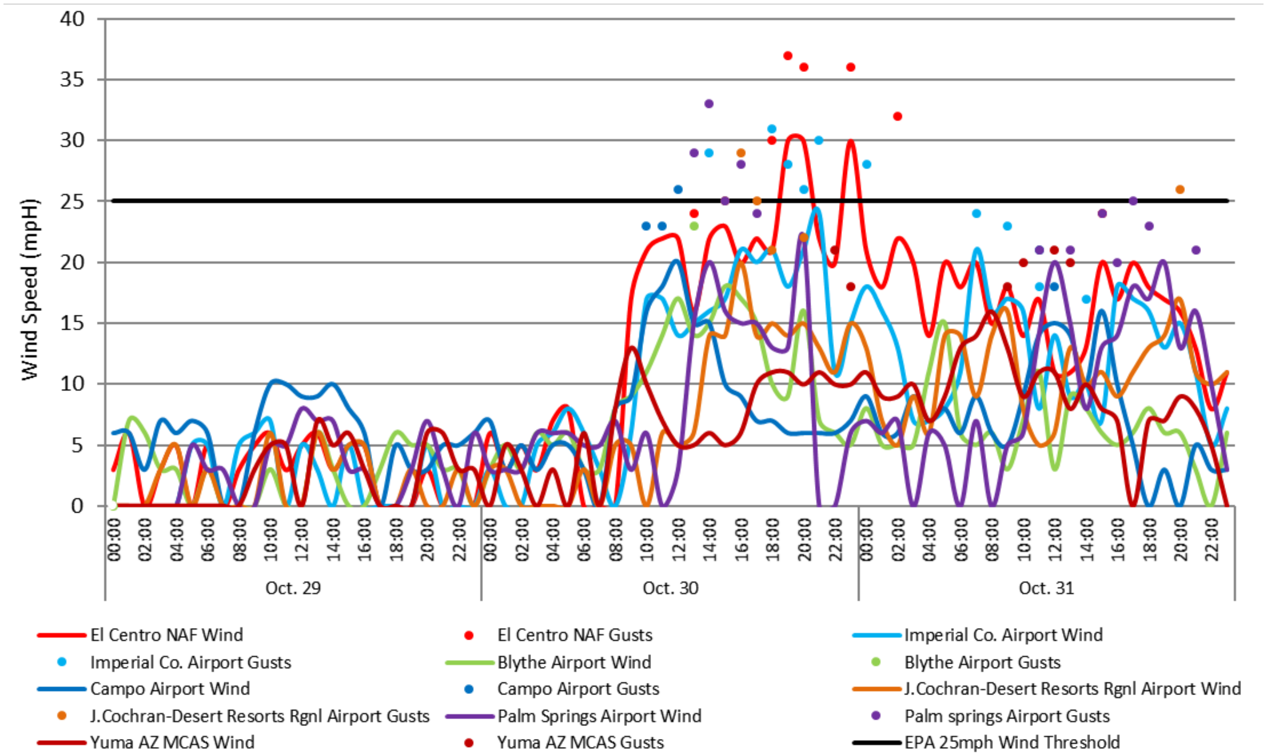

Fig 2-22: Is the graphical representation of the 72-hour measured winds speeds and gusts at regional airfields in southeast California and southwestern Arizona. The graph illustrates the significant number of hours where measured wind speeds and wind gusts where above 25 mph. It emphasizes that this was a regional event. Wind Data from the NCEI's QCLCD system

FIGURE 2-23
72-HOUR PM_{10} CONCENTRATIONS AT VARIOUS SITES

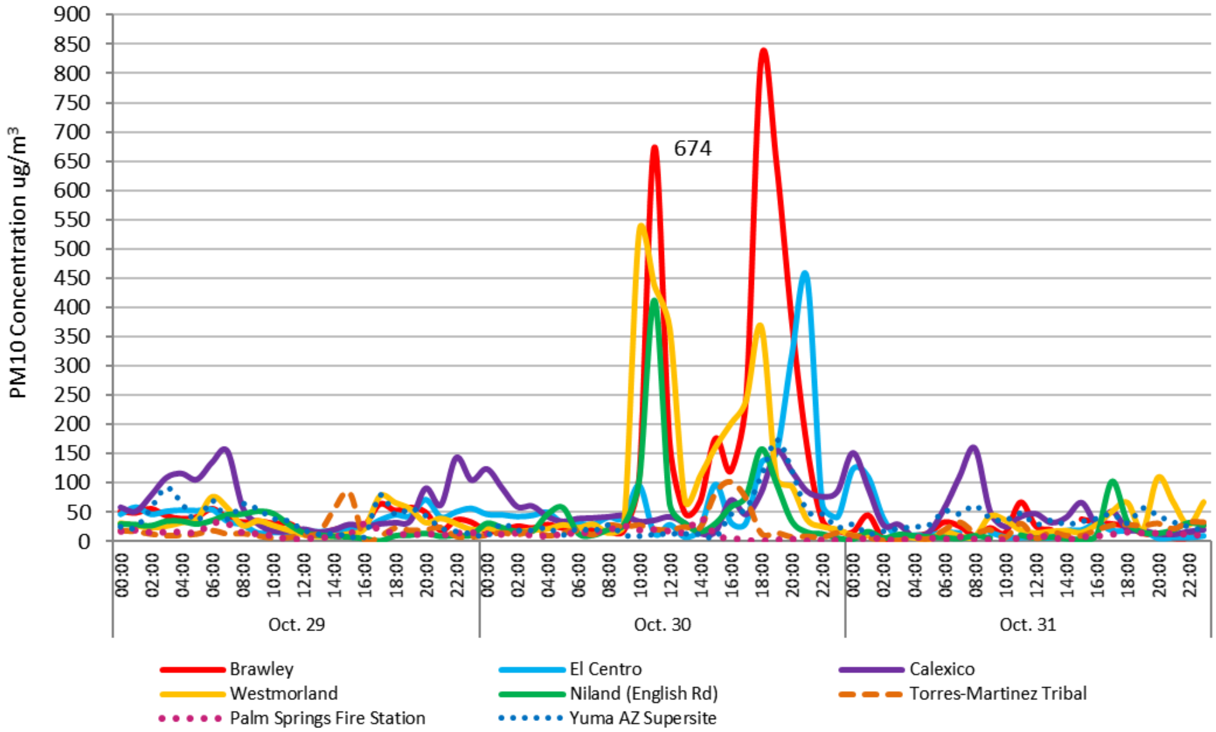

Fig. 2-23: Is the graphical representation of the 72-hour relative PM_{10} concentrations at various sites in southeast California and southwestern Arizona. The elevated PM_{10} concentrations at all sites on October 30, 2016 demonstrate the regional impact of the weather system and accompanying winds. Air quality data from the EPA's AQS data bank

III Historical Concentrations

III.1 Analysis

While naturally occurring high wind events may recur seasonally and at times frequently and qualify for exclusion under the EER, historical comparisons of the particulate concentrations and associated winds provide insight into the frequency of events within an identified area. The following time series plots illustrate that PM_{10} concentrations measured at the Brawley monitor on October 30, 2016, were compared to non-event and event days demonstrating the variability over several years and seasons. The analysis, also, provides supporting evidence that there exists a clear causal relationship between the October 30, 2016 high wind event and the exceedance measured at the Brawley monitor.

Figures 3-1 through 3-2 show the time series of available FRM and BAM 24-hr PM_{10} concentrations at the Brawley station for the period of January 1, 2010 through October 30, 2016. Note that prior to 2013, the BAM data was not considered FEM and was not reported into AQS.[7] In order to properly establish the variability of the event as it occurred on October 30, 2016, 24-hour averaged PM_{10} concentrations between January 1, 2010 and October 30, 2016 were compiled and plotted as a time series. All figures illustrate that the exceedance, which occurred on October 30, 2016 were outside the normal historical concentrations when compared to event and non-event days. Air quality data for all graphs was obtained through the EPA's AQS data bank.

[7] Pollutant concentration data contained in EPA's Air Quality System (AQS) are required to be reported in units corrected to standard temperature and pressure (25 C, 760 mm Hg). Because the PM_{10} concentrations prior to 2013 were not reported into the AQS database all BAM (FEM) data prior to 2013 within this report are expressed as micrograms per cubic meter (mg/m3) at local temperature and pressure (LTP) as opposed to standard temperature and pressure (STP, 760 torr and 25 C). The difference in concentration measurements between standard conditions and local conditions is insignificant and does not alter or cause any significant changes in conclusions to comparisons of PM_{10} concentrations to PM_{10} concentrations with in this demonstration.

FIGURE 3-1
BRAWLEY HISTORICAL
FRM AND FEM PM_{10} 24-HR AVG CONCENTRATIONS
JANUARY 1, 2010 TO OCTOBER 30, 2016

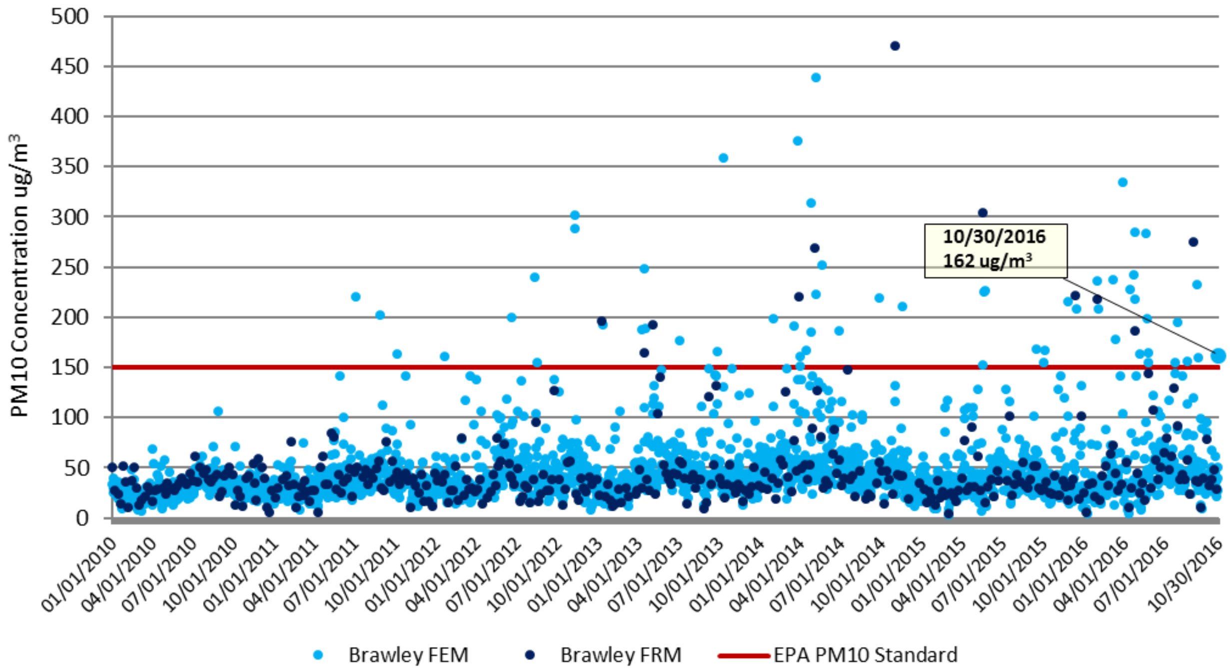

Fig 3-1: A comparison of PM_{10} historical concentrations demonstrates that the measured concentration of 162 µg/m^3 on October 30, 2016 at the Brawley monitoring station was outside the normal historical measurements. The far vast number of samples fall way below the exceedance threshold

The time series, **Figures 3-1,** for Brawley included 2,495 sampling days (January 1, 2010 through October 30, 2016). During this period the Brawley station (**Figure 3-1**) measured 2,620 credible samples measured by either FRM or FEM monitors between January 1, 2010 and October 30, 2016. Overall, the time series illustrates that of the 2,620 credible samples measured during there was a total of 58 exceedance days, which is a 2.2% occurrence rate. Clearly, exceedances by the Brawley monitoring station over a historical period is a rare event.

FIGURE 3-2
BRAWLEY SEASONAL COMPARISON
PM_{10} 24-HR AVG CONCENTRATIONS
OCTOBER THROUGH DECEMBER, 2010 TO (OCTOBER 30) 2016

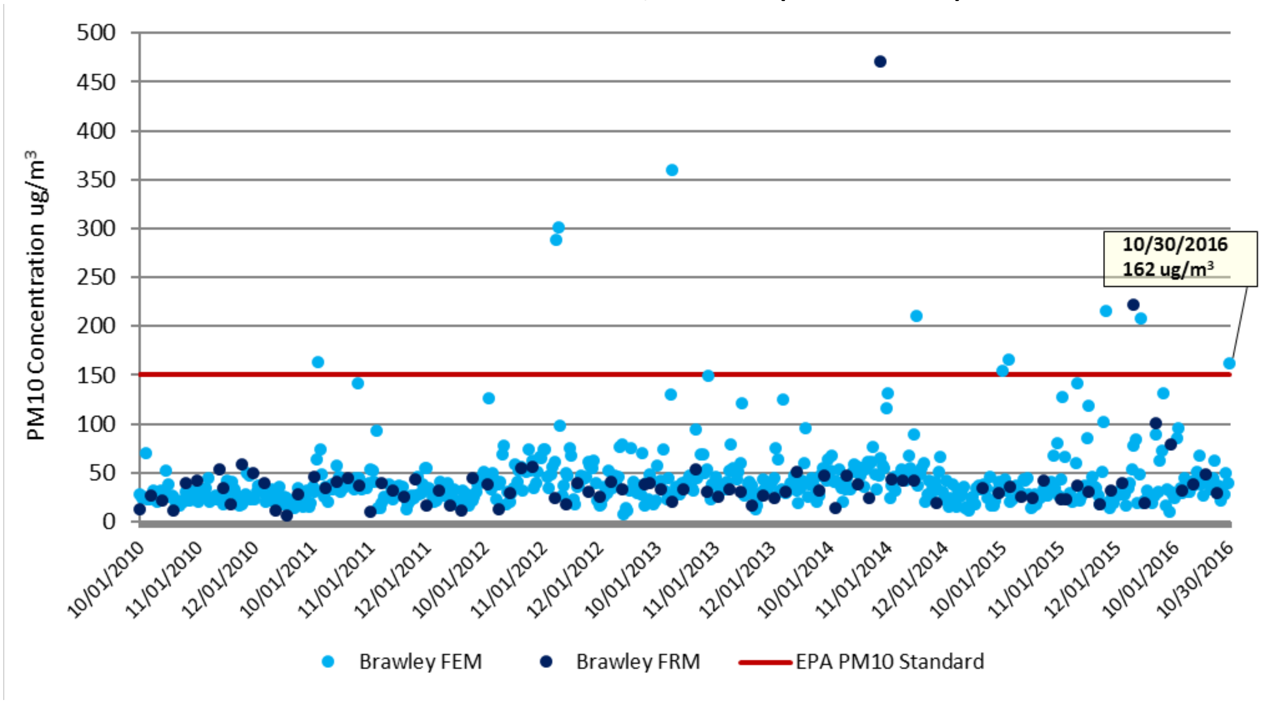

Fig 3-2: A comparison of PM_{10} historical concentrations demonstrates that the measured concentration of 162 µg/m^3 on October 30, 2016 at the Brawley monitoring station was outside the normal seasonal historical measurements. The far vast number of samples fall way below the exceedance threshold

Figure 3-2 displays the seasonal fluctuations over 582 sampling days at the Brawley station for months October through December of years 2010 through 2016 (2016 ending October 30). The seasonal sampling period for Brawley (**Figure 3-5**) contains 617 combined FRM and FEM samples. Of these, 10 exceedances occurred during the third quarter which translates into 1.6% of all samples. Clearly, exceedances by the Brawley monitoring station over a seasonal historical period is a rare event.

Figure 3-3 displays percentile rankings for Brawley over the historical period of January 2010 through October 30, 2016.

FIGURE 3-3
BRAWLEY HISTORICAL
PM_{10} 24 HR FRM & FEM CONCENTRATIONS
JANUARY 2010 THROUGH OCTOBER 30, 2016

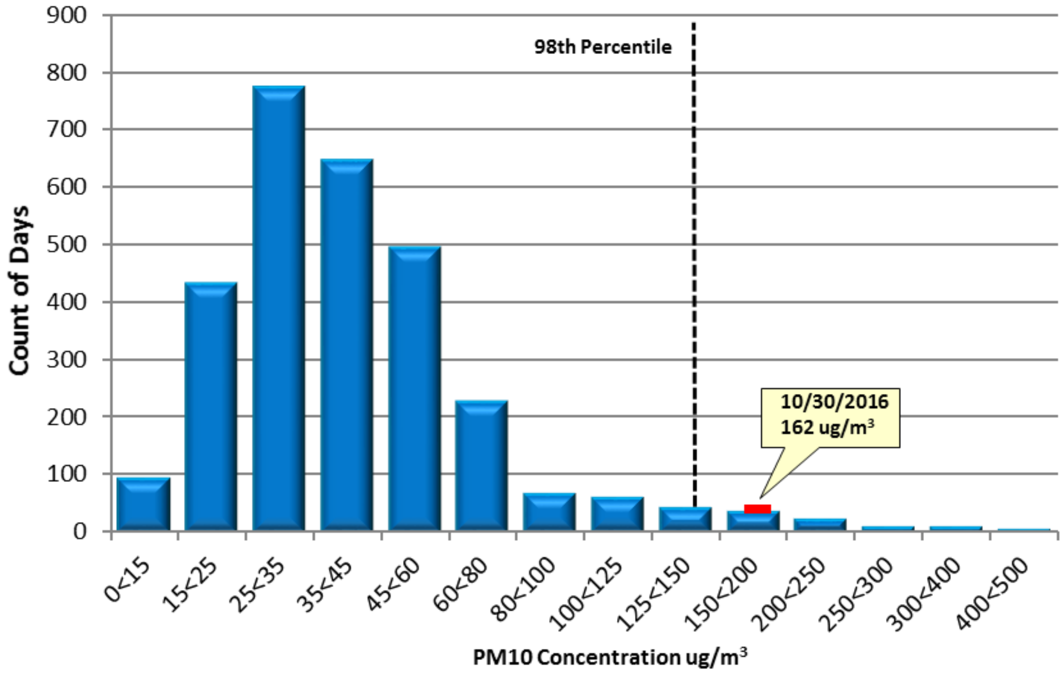

Fig 3-3: The 24-hr average PM_{10} concentration at the Brawley monitoring station demonstrates that the concentration of 164 µg/m^3 on October 30, 2016 2016 was in excess of the 98th percentile

For the combined FRM and FEM data sets the annual historical and the seasonal historical PM_{10} concentrations of 164 µg/m^3 at Brawley is above the 98th percentile ranking. Looking at the annual time series concentrations, the seasonal time series concentrations, and the percentile rankings for the historical patterns, the October 30, 2016 measured exceedance is clearly outside the normal concentration levels when comparing to non-event days and event days.

III.2 Summary

The information provided, above, by the time series plots, seasonal time series plots, and the percentile rankings illustrate that the PM_{10} concentration observed on October 30, 2016 occurs infrequently. When comparing the measured PM_{10} levels on October 30, 2016 and following USEPA EER guidance, this demonstration provides supporting evidence that the measured exceedances measured at the Brawley monitoring site was outside the normal historical and seasonal historical concentration levels.

The historical concentration analysis provided here supports the determination that the October 30, 2016 natural event affected the concentrations levels at the Brawley monitor causing an exceedance. The concentration analysis further supports that the natural event affected air quality in such a way that there exists a clear causal relationship between the measured exceedances on October 30, 2016 and the natural event, qualifying the natural event as an Exceptional Event.

IV Not Reasonably Controllable or Preventable

According to the October 3, 2016 promulgated revision to the Exceptional Event (EE) rule under 40 CFR §50.14(b)(8) air agencies must address the "not reasonably controllable or preventable" (nRCP) criterion as two prongs. In order to properly address the nRCP criterion the ICAPCD must not only identify the natural and anthropogenic sources of emissions causing and contributing to the monitored exceedance but must identify the relevant State Implementation Plan (SIP) measures and/or other enforceable control measures in place for the identified sources. An effective analysis of the nRCP must include the implementation status of the control measures in order to properly consider the measures as enforceable. USEPA considers control measures to be enforceable if approved into the SIP within 5 years of an EE demonstration submittal. The identified control measures must address those specific sources that are identified as causing or contributing to a monitored exceedance.

The final EE rule revision explains that an event is considered not reasonably controllable if reasonable measures to control the impact of the event on air quality were applied at the time of the event. Similarly, an event is considered not reasonably preventable if reasonable measures to prevent the event were applied at the time of the event. However, for "high wind events" when PM_{10} concentrations are due to dust raised by high winds from desert areas whose sources are controlled with Best Available Control Measures (BACM) then the event is a "natural event" where human activity plays little or no direct causal role and thus is considered not preventable.

This section begins by providing background information on all SIP and other enforceable control measures in force during the EE for October 30, 2016. In addition, this October 30, 2016, demonstration provides technical and non-technical evidence that strong and gusty westerly winds blew across portions of the Sonoran Desert to the west to west-northwest and into Imperial County suspending particulate matter affecting the Brawley monitor on October 30, 2016. This section identifies all natural and anthropogenic sources and provides regulatory evidence of the enforceability of the control measures in place during the October 30, 2016 EE.

IV.1 Background

Inhalable particulate matter (PM_{10}) contributes to effects that are harmful to human health and the environment, including premature mortality, aggravation of respiratory and cardiovascular disease, decreased lung function, visibility impairment, and damage to vegetation and ecosystems. Upon enactment of the 1990 Clean Air Act (CAA) amendments, Imperial County was classified as moderate nonattainment for the PM_{10} NAAQS under CAA sections 107(d)(4)(B) and 188(a). By November 15, 1991, such areas were required to develop and submit State Implementation Plan (SIP) revisions providing for, among other things, implementation of reasonably available control measures (RACM).

Partly to address the RACM requirement, ICAPCD adopted local Regulation VIII rules to control PM_{10} from sources of fugitive dust on October 10, 1994, and revised them on November 25, 1996. USEPA did not act on these versions of the rules with respect to the federally enforceable SIP.

On August 11, 2004, USEPA reclassified Imperial County as a serious nonattainment area for PM_{10}. As a result, CAA section 189(b)(1)(B) required all BACM to be implemented in the area within four years of the effective date of the reclassification, i.e., by September 10, 2008.

On November 8, 2005, partly to address the BACM requirement, ICAPCD revised the Regulation VIII rules to strengthen fugitive dust requirements. On July 8, 2010, USEPA finalized a limited approval of the 2005 version of Regulation VIII, finding that the seven Regulation VIII rules largely fulfilled the relevant CAA requirements. Simultaneously, USEPA also finalized a limited disapproval of several of the rules, identifying specific deficiencies that needed to be addressed to fully demonstrate compliance with CAA requirements regarding BACM and enforceability.

In September 2010, ICAPCD and the California Department of Parks and Recreation (DPR) filed petitions with the Ninth Circuit Federal Court of Appeals for review of USEPA's limited disapproval of the rules. After hearing oral argument on February 15, 2012, the Ninth Circuit directed the parties to consider mediation before rendering a decision on the litigation. On July 27, 2012, ICAPCD, DPR and USEPA reached agreement on a resolution to the dispute which included a set of specific revisions to Regulation VIII. These revisions are reflected in the version of Regulation VIII adopted by ICAPCD on October 16, 2012 and approved by USEPA April 22, 2013. Since 2006 ICAPCD had implemented regulatory measures to control emissions from fugitive dust sources and open burning in Imperial County.

FIGURE 4-1
REGULATION VIII GRAPHIC TIMELINE DEVELOPMENT

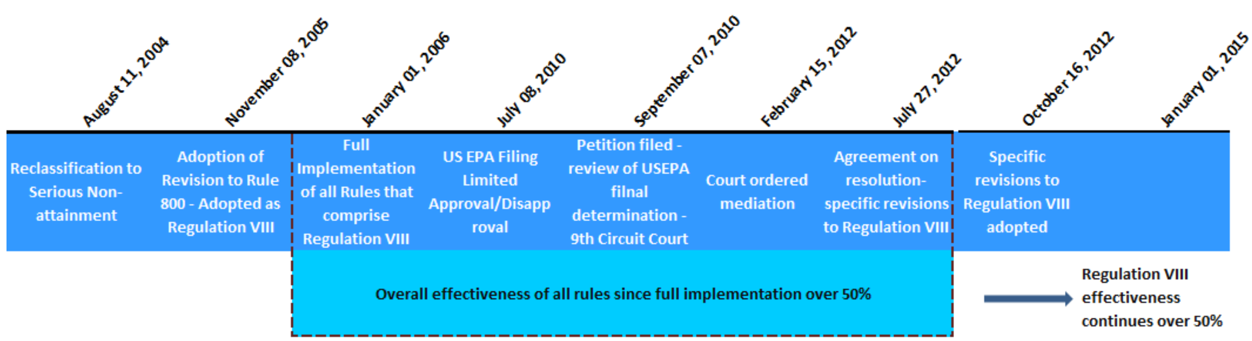

Fig 4-1: Regulation VIII Graphic Timeline

IV.1.a Control Measures

A brief summary of Regulation VIII which is comprised of seven fugitive dust rules is found below. The complete set of rules can be found in **Appendix D**.

ICAPCD's Regulation VIII consists of seven interrelated rules designed to limit emissions of PM_{10} from anthropogenic fugitive dust sources in Imperial County.

Rule 800, General Requirements for Control of Fine Particulate Matter, provides definitions, a compliance schedule, exemptions and other requirements generally applicable to all seven rules. It requires the United States Bureau of Land Management (BLM), United States Border Patrol (BP) and DPR to submit dust control plans (DCP) to mitigate fugitive dust from areas and/or activities under their control. Appendices A and B within Rule 800 describe methods for determining compliance with opacity and surface stabilization requirements in Rules 801 through 806.

Rule 801, Construction and Earthmoving Activities, establishes a 20% opacity limit and control requirements for construction and earthmoving activities. Affected sources must submit a DCP and comply with other portions of Regulation VIII regarding bulk materials, carry-out and track-out, and paved and unpaved roads. The rule exempts single family homes and waives the 20% opacity limit in winds over 25 mph under certain conditions.

Rule 802, Bulk Materials, establishes a 20% opacity limit and other requirements to control dust from bulk material handling, storage, transport and hauling.

Rule 803, Carry-Out and Track-Out, establishes requirements to prevent and clean-up mud and dirt transported onto paved roads from unpaved roads and areas.

Rule 804, Open Areas, establishes a 20% opacity limit and requires land owners to prevent vehicular trespass and stabilize disturbed soil on open areas larger than 0.5 acres in urban areas, and larger than three acres in rural areas. Agricultural operations are exempted.

Rule 805, Paved and Unpaved Roads, establishes a 20% opacity limit and control requirements for unpaved haul and access roads, canal roads and traffic areas that meet certain size or traffic thresholds. It also prohibits construction of new unpaved roads in certain circumstances. Single-family residences and agricultural operations are exempted.

Rule 806, Conservation Management Practices, requires agricultural operation sites greater than 40 acres to implement at least one conservation management practice (CMP) for each of several activities that often generates dust at agricultural operations. In addition, agricultural operation sites must prepare a CMP plan describing how they comply with Rule 806, and must make the CMP plan available to the ICAPCD upon request.

IV.1.b Additional Measures

Imperial County Natural Events Action Plan (NEAP)

On August 2005, the ICAPCD adopted a NEAP for the Imperial County, as was required under the former USEPA Natural Events Policy, to address PM_{10} events by:

- Protecting public health;
- Educating the public about high wind events;
- Mitigating health impacts on the community during future events; and
- Identifying and implementing BACM measures for anthropogenic sources of windblown dust.

Smoke Management Plan (SMP) Summary

There are 35 Air Pollution Control Districts or Air Quality Management Districts in California which are required to implement a district-wide smoke management program. The regulatory basis for California's Smoke Management Program, codified under Title 17 of the California Code of Regulations is the "Smoke Management Guidelines for Agricultural and Prescribed Burning" (Guidelines). California's 1987 Guidelines were revised to improve interagency coordination, avoid smoke episodes, and provide continued public safety while providing adequate opportunity for necessary open burning. The revisions to the 1987 Guidelines were approved March 14, 2001. All air districts, with the exception of the San Joaquin Valley Air Pollution Control District (SJAPCD) were required to update their existing rules and Smoke Management Plans to conform to the most recent update to the Guidelines.

Section 80150 of Title 17 specifies the special requirements for open burning in agricultural operations, the growing of crops and the raising of fowl or animals. This section specifically requires the ICAPCD to have rules and regulations that require permits that contain requirements that minimize smoke impacts from agricultural burning.

On a daily basis, the ICAPCD reviews surface meteorological reports from various airport agencies, the NWS, State fire agencies and CARB to help determine whether the day is a burn day. Using a four quadrant map of Imperial County allowed burns are allocated in such a manner as to assure minimal to no smoke impacts safeguarding the public health. Finally, all permit holders are required to notice and advise members of the public of a potential burn. This noticing requirement is known as the Good Neighbor Policy. On October 30, 2016 the ICAPCD declared a No Burn day **(Appendix A).** No complaints were filed for agricultural burning on October 30, 2016.

IV.1.c Review of Source Permitted Inspections and Public Complaints

A query of the ICAPCD permit database was compiled and reviewed for active permitted sources throughout Imperial County and specifically around during the October 30, 2016 PM_{10} exceedances. Both permitted and non-permitted sources are required to comply with Regulation VIII requirements that address fugitive dust emissions. The identified permitted sources are Aggregate Products, Inc., US Gypsum Quarry, Imperial Aggregates (Val-Rock, Inc., and Granite Construction), US Gypsum Plaster City, Clean Harbors (Laidlaw Environmental Services), Bullfrog Farms (Dairy), Burrtec Waste Industries, Border Patrol Inspection station, Centinela State Prison, various communications towers not listed and various agricultural operations. Non-permitted sources include the wind farm known as Ocotillo Express, and a solar facility known as CSolar IV West. Finally, the desert regions are under the jurisdiction of the Bureau of Land Management and the California Department of Parks (Including Anza Borrego State Park and Ocotillo Wells).

An evaluation of all inspection reports, air quality complaints, compliance reports, and other documentation indicate no evidence of unusual anthropogenic-based PM_{10} emissions. October 30, 2016 was officially designated as a No Burn day. No complaints were filed on October 30, 2016 related either to agricultural or waste burning or dust.

FIGURE 4-2
PERMITTED SOURCES

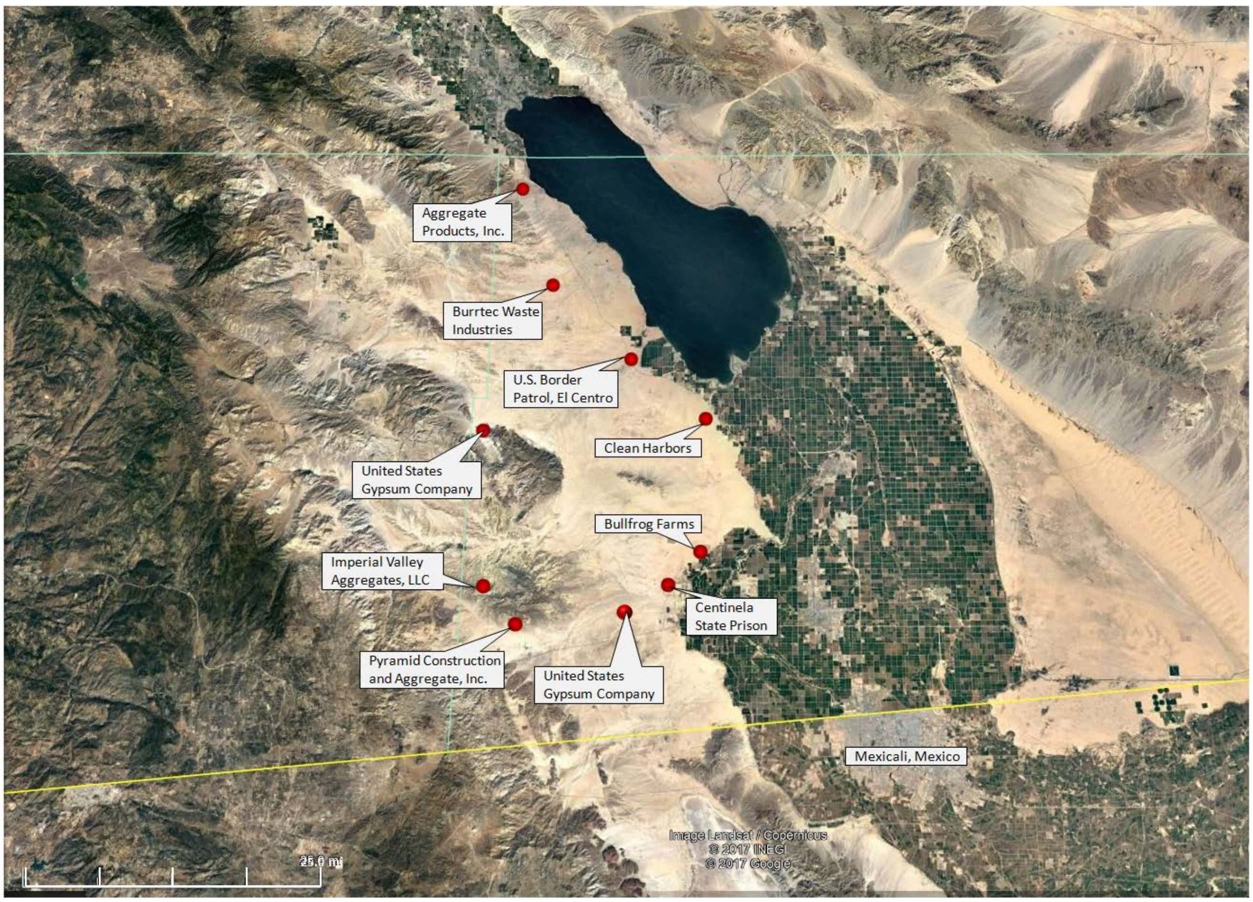

Fig 4-2: The above map identifies those permitted sources located west, northwest and southwest of the Brawley monitor. The green line to the north denotes the political division between Imperial and Riverside counties. The yellow line below denotes the international border between the United States and Mexico. The green checker-boarded areas are a mixed use of agricultural and community parcels. In addition the desert areas are managed either by the Bureau of Land Management or the California Department of Parks. Base map from Google Earth.

FIGURE 4-3
NON-PERMITTED SOURCES

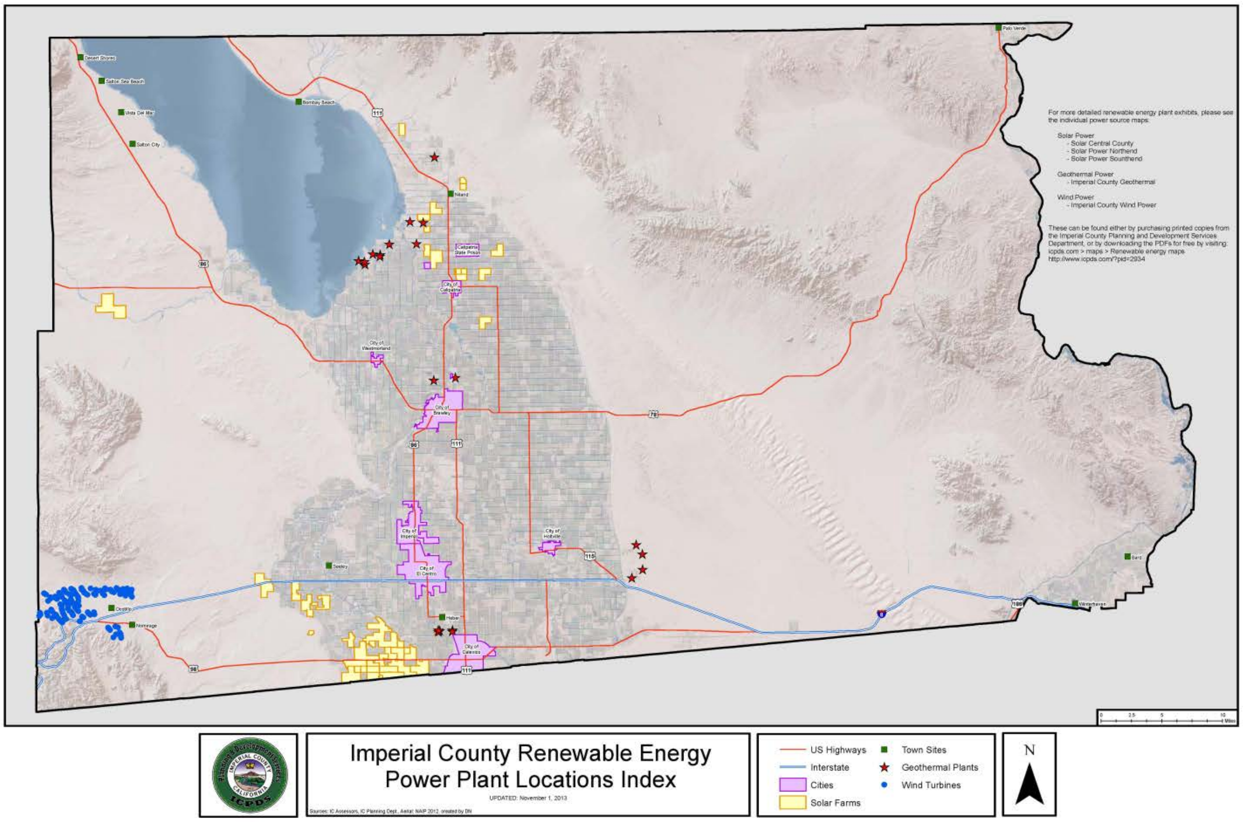

Fig 4-3: The above map identifies those power sources located west, northwest and southwest of the Brawley monitor. Blue indicate the Wind Turbines, Yellow are the solar farms and stars are geothermal plants.

IV.2 Forecasts and Warnings

The ICAPCD and the National Weather Service (NWS) provided an extended week notification via the ICAPCD's webpage on Friday, October 28, 2016 explaining that a low pressure system would move over the region during the weekend and bring gusty winds across the mountains, desert slopes, and deserts in southeast California. A zone forecast for Imperial County forecasted west winds of 20 mph with gusts up to 30 mph by the afternoon. A Wind Advisory[8] was issued that included the San Diego County desert slopes and deserts. Winds were forecasted to reach 25 mph with gusts up to 35 mph. Blowing dust and blowing sand were expected. The ICAPCD posted on its website an air quality forecast that advised gusty westerly winds during the afternoon and evening would lead to areas of blowing dust.

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[8] A Wind Advisory is issued when the following conditions are expected: 1) sustained winds of 31 to 39 mph for an hour or more and/or 2) wind gusts of 46 to 57 mph for any duration. Source: https://www.weather.gov/lwx/WarningsDefined.

IV.3 Wind Observations

Wind data during the event were available from airports in eastern Riverside County, southeastern San Diego County, southwestern Yuma County (Arizona), northern Mexico, and Imperial County (**Table 2-2**). Data were also collected from automated meteorological instruments that were upstream from the Brawley monitoring station during the wind event. On October 30, 2016 the El Centro NAF (KNJK) measured winds at or above 25 mph for multiple hours. Automated instruments at the upstream location Borrego Springs also reported winds at or above 25 mph. Wind speeds of 25 mph are normally sufficient to overcome most PM_{10} control measures. During the October 30, 2016 event wind speeds were at or above the 25mph threshold, overcoming the BACM in place.

IV.4 Summary

The weather and air quality forecasts and warnings outlined in this section demonstrate that high winds associated with the movement of a low pressure system through the region transported dust that caused uncontrollable PM_{10} emissions. The BACM list as part of the control measures in Imperial County for fugitive dust emissions were in place at the time of the event. These control measures are required for areas designated as "serious" non-attainment for PM_{10}, such as Imperial County. Thus, the BACM in place at the time of the event were beyond reasonable. In addition, surface wind measurements at or upstream of the Brawley monitoring station during the event were high enough (at or above 25 mph, with wind gusts of 37 mph) that BACM PM_{10} control measures would have been overwhelmed.

Finally, a high wind dust event can be considered as a natural event, even when portions of the wind-driven emissions are anthropogenic, as long as those emissions have a clear causal relationship to the event and were determined to be not reasonably controllable or preventable. This demonstration has shown that the event that occurred on October 30, 2016 was not reasonably controllable or preventable despite the strong and in force BACM within the affected areas in Imperial County. This demonstration has similarly established a clear causal relationship between the exceedances and the high wind event timeline and geographic location. The October 30, 2016 event can be considered an exceptional event under the requirements of the exceptional event rule.

V Clear Causal Relationship

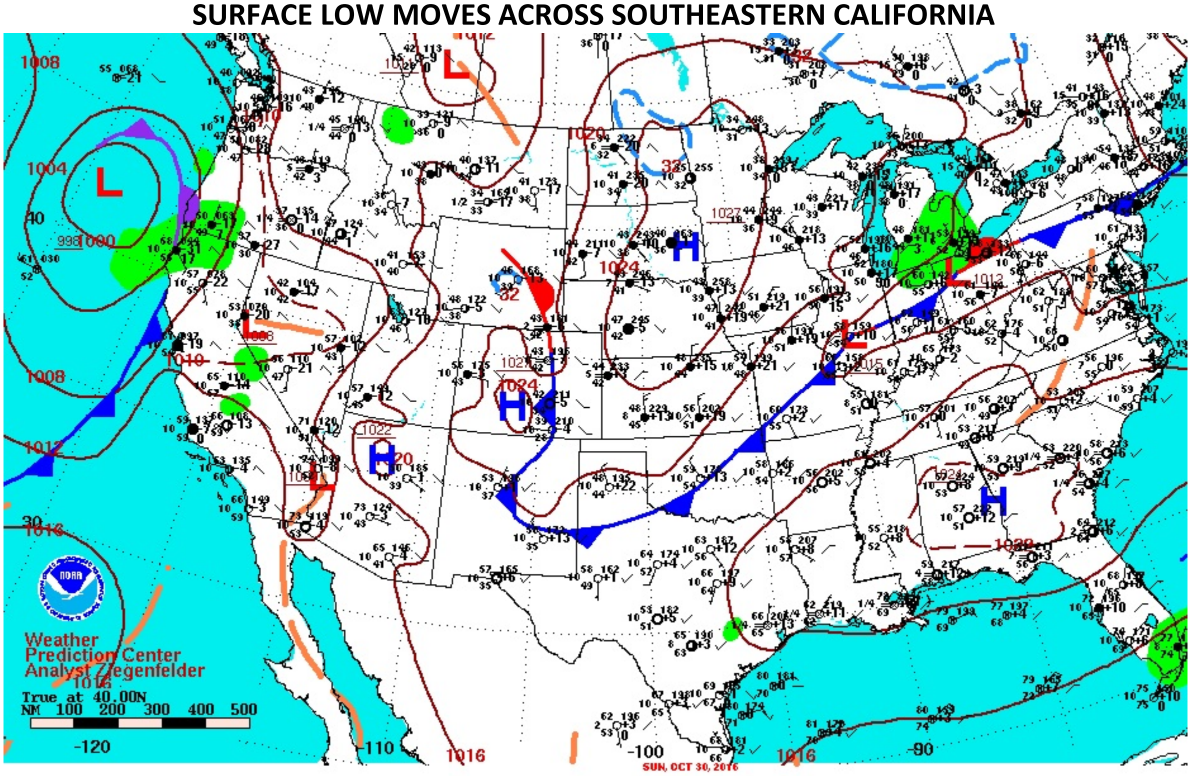
V.1 Discussion

Meteorological observations for October 30, 2016 identified a low pressure system that moved into southeast California. This led to the tightening of the surface gradient which in turn created a strong onshore flow across the region. The strengthening of the onshore flow, as the low-pressure intensified caused gusty west winds in the mountains and deserts of southeastern California.

Entrained windblown dust from natural areas, particularly from the desert areas west of the Brawley monitor, along with anthropogenic sources controlled with BACM, is confirmed by the meteorological and air quality observations on October 30, 2016.

Figures 5-1 through Figure 5-3 are images that illustrate the low pressure system, the tightening of the surface gradient, and the resulting high winds during key periods on October 30, 2016.

FIGURE 5-1
SURFACE LOW MOVES ACROSS SOUTHEASTERN CALIFORNIA



Surface Weather Map and Station Weather at 7:00 A.M. E.S.T.

Fig 5-1: a Surface Weather Map on 0400 PST October 30, 2016 shows the surface low dipping down into southeastern California. Source:
http://www.wpc.ncep.noaa.gov/dailywxmap/dwm_stnplot_20161030.html

FIGURE 5-2
SURFACE GRADIENT TIGHTENS

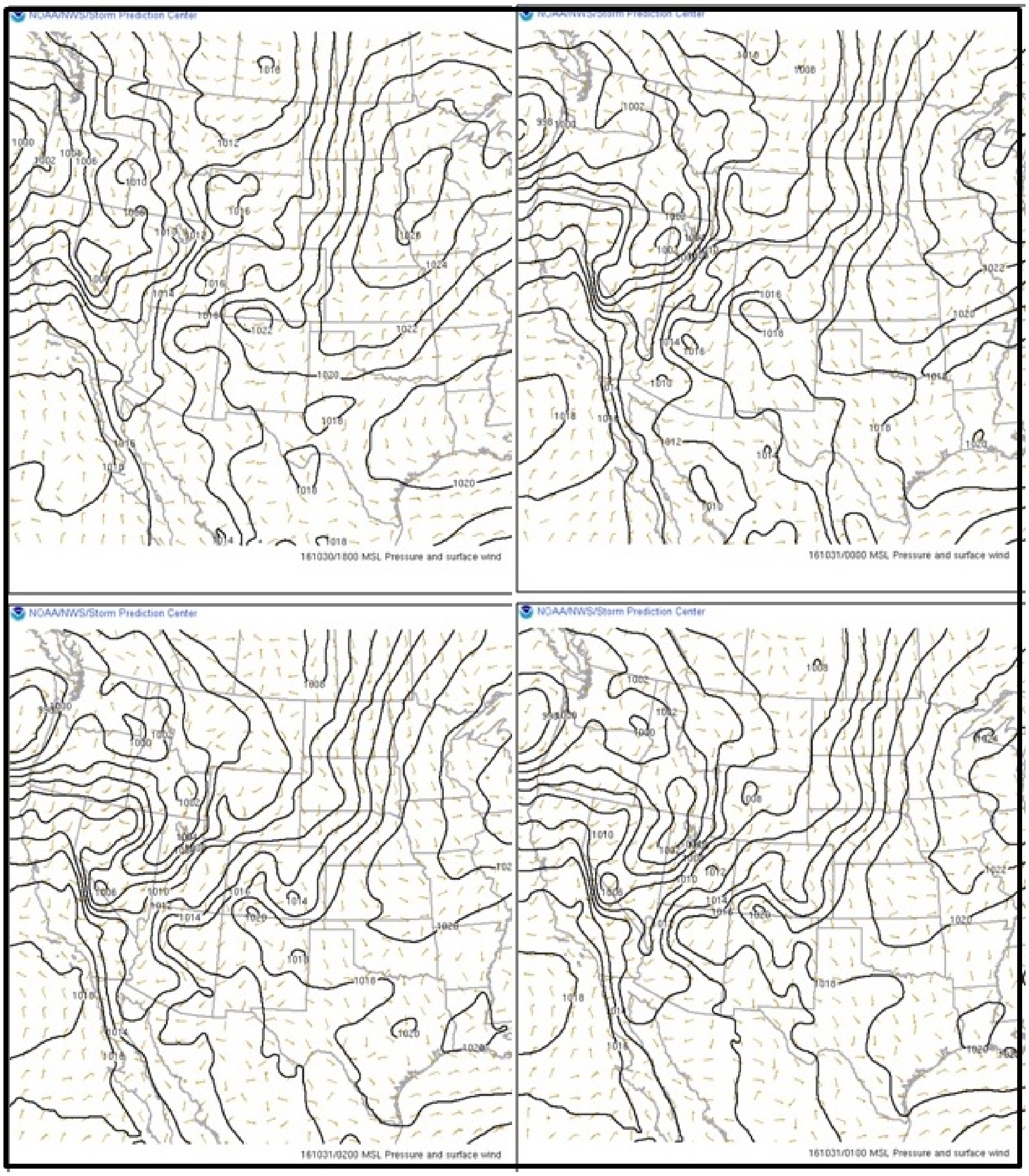


Fig 5-2: Four surface maps depict the surface gradient during key periods during the exceptional event on October 30, 2016. Clockwise from top left: 1000; 1600; 1700; 1800 PST. The top left image shows the gradient becoming moderately packed at 1000 PST just prior to the time when KNJK began to see an uptick in wind speeds which led to the initial spike in PM_{10} concentrations at 1100 PST. Winds continued to increase during the day which is reflected in the tightening of the gradient at 1600 (top right); 1700 (bottom right); and 1800 (bottom left). It was during this period that winds and gusts were strongest leading to peak concentrations at 1800 PST. Source: NOAA Storm Prediction Center; http://www.spc.noaa.gov

FIGURE 5-3
SURFACE WIND SPEED – OCTOBER 30

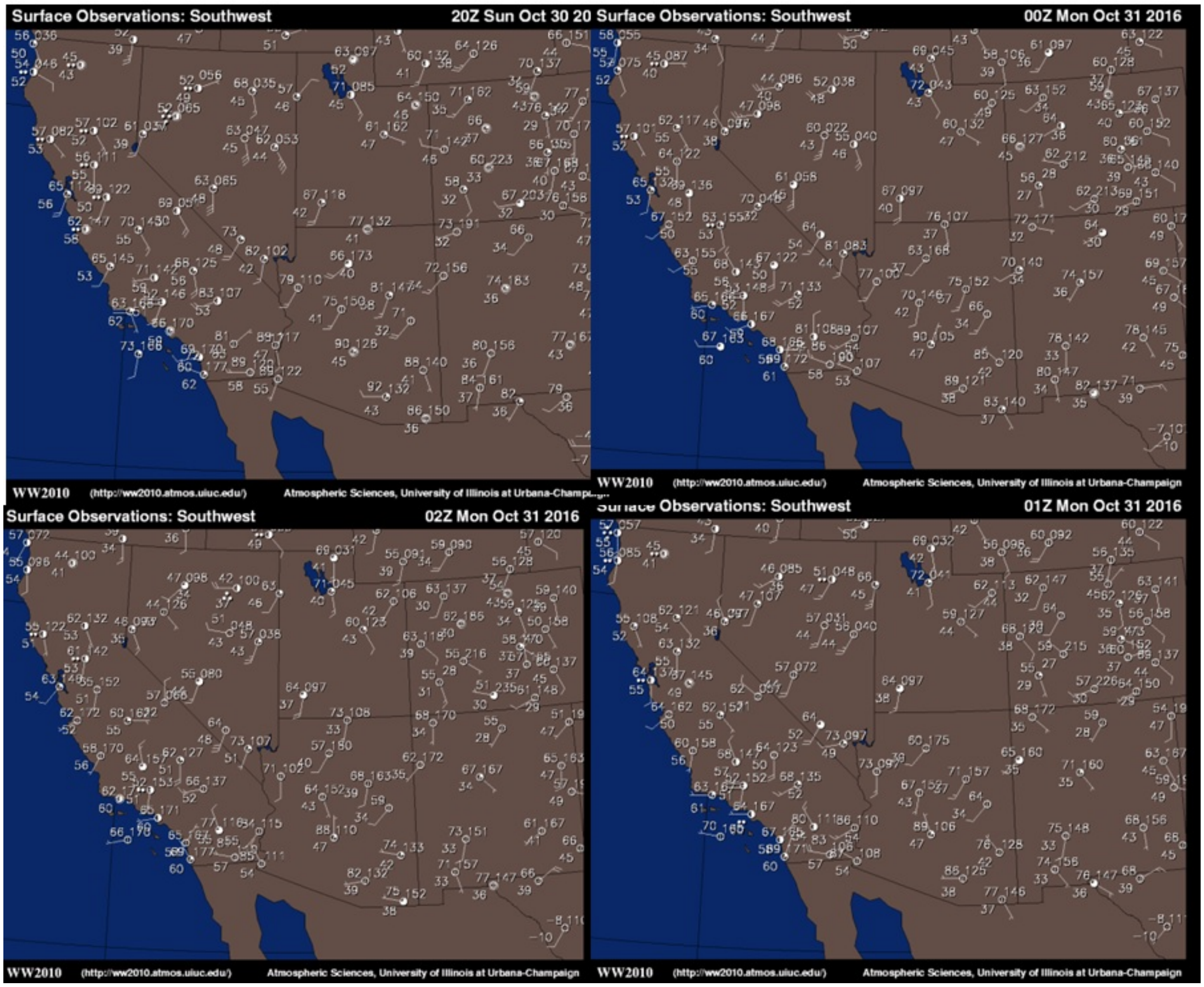


Fig 5-3: A quad of Surface Observation Maps depicting wind barbs at KNJK at times when winds were strongest at the airfield. At 1200 PST (top left) winds were westerly at 22 mph. This was just Brawley experienced a brief surge of concentrations at 1100. By 1600 (top right), 1700 (bottom right), and 1800 (bottom left) winds had shifted more WNW and were even stronger at the airfield. The WNW wind transported dust from outside Imperial County as it passed through the Borrego Springs area, which was under a wind advisory along with expected blowing dust and sand. Source: Image/Text/Data from the University of Illinois WW2010 Project

The EPA accepts a high wind threshold for sustained winds of 25 mph in California and 12 other states.[9] **Table 5-1** provides a temporal relationship of wind speeds, wind direction, wind gusts (if available), and PM_{10} concentrations at the exceeding stations on October 30, 2016. The tables

[9] "Treatment of Data Influenced by Exceptional Events; Final Guidance", FR Vol. 81, No. 191, 68279, October 3, 2016

show that peak hourly concentrations took place immediately following or during the period of high upstream wind speeds.

TABLE 5-1
UPSTREAM WIND SPEEDS AND BRAWLEY PM_{10} CONCENTRATIONS OCTOBER 30, 2016

EL CENTRO NAF (KNJK)				IMPERIAL CO AIRPORT (KIPL)				BORREGO SPRINGS (BRGSD)				FISH CREEK MOUNTAINS (FHCC1)				BRAWLEY FEM	
HOUR	W/S	W/D	W/G	HOUR	W/S	W/D	W/G	HOUR	W/S	W/D	W/G	HOUR	W/S	W/D	W/G	HOUR	PM_{10} (µg/m^3)
00:56	6	300		00:53	3	300		00:00	3	316	4	0:26	8	206	10	00:00	19
01:56	3	260		01:53	0	0		01:00	3	316	4	1:26	6	195	9	01:00	20
02:56	5	240		02:53	0	0		02:00	2	181	3	2:26	5	192	8	02:00	27
03:56	3	110		03:53	5	130		03:00	1	297	4	3:26	7	195	9	03:00	24
04:56	7	150		04:53	6	140		04:00	2	126	7	4:26	8	175	15	04:00	30
05:56	8	150		05:53	8	130		05:00	1	313	3	5:26	12	201	18	05:00	24
06:56	0	0		06:53	6	130		06:00	3	290	4	6:26	12	205	20	06:00	25
07:56	0	0		07:53	3	110		07:00	5	358	7	7:26	15	194	22	07:00	20
08:56	0	0		08:53	0	0		08:00	4	58	8	8:26	6	159	22	08:00	18
09:56	17	230		09:53	6	350		09:00	14	250	20	9:26	17	192	28	09:00	20
10:56	21	260		10:53	17	260		10:00	13	220	17	10:26	11	176	24	10:00	110
11:56	22	260		11:53	17	270		11:00	11	201	15	11:26	7	108	18	11:00	674
12:56	22	280		12:53	14	240		12:00	6	185	18	12:26	10	211	25	12:00	168
13:56	16	290	24	13:53	15	300		13:00	6	46	12	13:26	18	202	29	13:00	49
14:56	22	280		14:53	16	290	29	14:00	9	198	21	14:26	13	215	28	14:00	70
15:56	23	270		15:53	17	290		15:50	15	231	33	15:26	12	187	27	15:00	177
16:56	20	270		16:53	21	280		16:30	18	247	34	16:26	7	286	28	16:00	121
17:56	22	290		17:53	20	280		17:20	25	237	36	17:26	9	223	19	17:00	242
18:56	21	290	30	18:53	21	290	31	18:10	18	252	28	18:26	18	192	29	18:00	824
19:56	30	290	37	19:53	18	290	28	19:00	10	282	16	19:26	12	170	28	19:00	647
20:56	30	280	36	20:53	21	290	26	20:00	5	261	10	20:26	9	148	19	20:00	378
21:56	22	290		21:53	24	290	30	21:00	4	265	7	21:26	9	183	17	21:00	163
22:56	20	300		22:53	11	310		22:00	7	311	14	22:26	11	177	15	22:00	37
23:56	30	300	36	23:53	15	300		23:00	11	360	17	23:26	17	162	19	23:00	20

*Wind data for KNJK and KIPL from the NCEI's QCLCD system. Wind data for Borrego Springs (BRGSD) and Fish Creek Mountains (FHCC1) from the University of Utah's MesoWest system. Brawley station does not measure wind data. Wind speeds = mph; Direction = degrees.

Figure 5-4 is a graphic depiction that combines the HYPSLIT trajectory, wind speeds and significant corresponding PM_{10} concentrations in the hours leading up to and during the peak concentrations at Brawley. The trajectory ends at 1800 PST during the hour of peak PM_{10} concentrations of 824 µg/m^3. Although the HYSPLIT trajectories indicate a more westerly approach, wind directions at KIPL and KNJK were tracking more WNW by the end of the day. This shift to the WNW can be seen in the HYSPLIT trajectories in the final hour or two. Dust was entrained earlier in the day by a brief spurt of westerly winds. Later, wind direction shifted to the

WNW which allowed dust to be transported from arid desert soils beyond Imperial County. The San Diego County deserts and the Borrego Springs area were under a wind advisory with expectations of blowing sand and dust (**Appendix A**).

FIGURE 5-4
EXCEEDANCE TIMELINE – OCTOBER 30, 2016

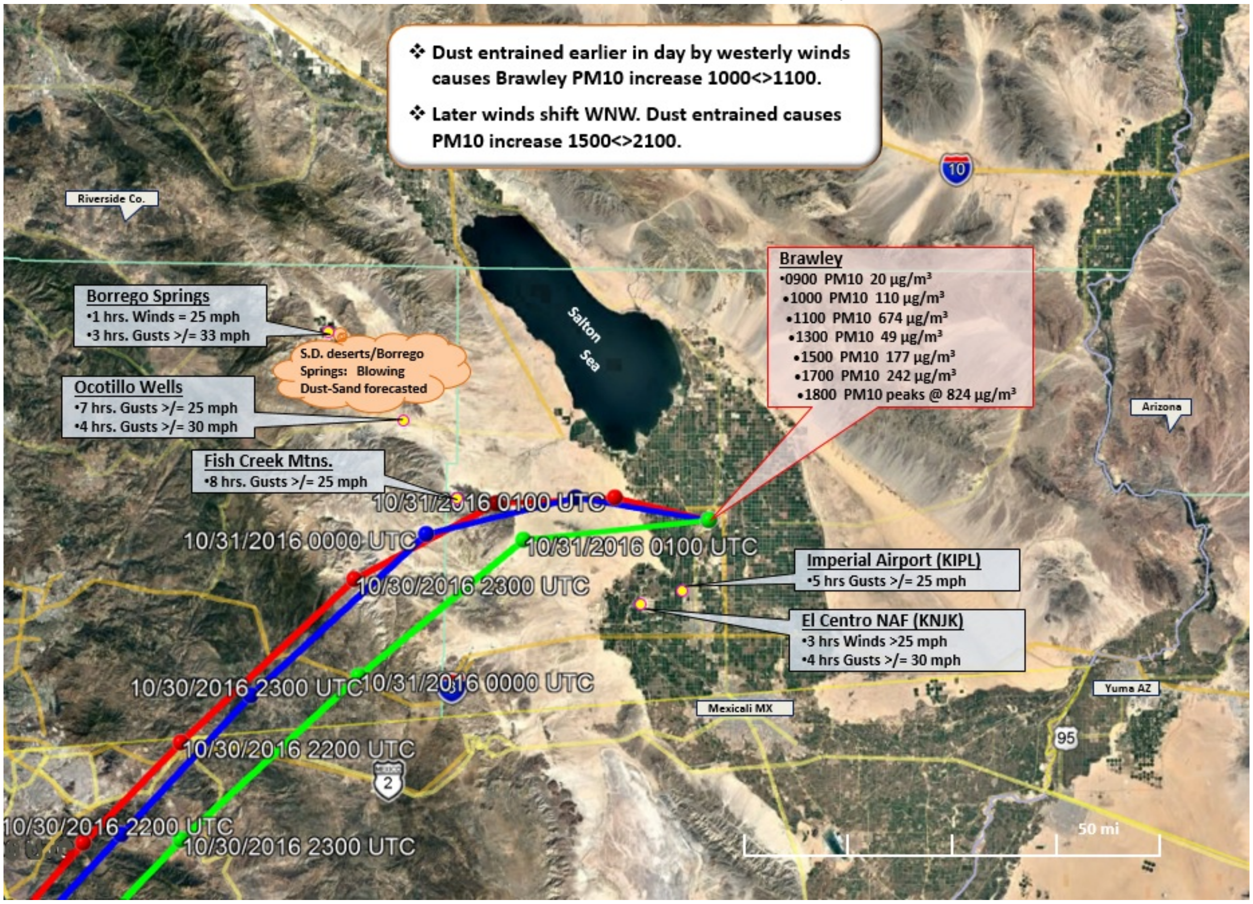


Fig 5-4: The 12-hour HYSPLIT trajectories show the path of the air parcel ending at Brawley at 1800 PST on October 30, 2016. Red trajectory indicates air flow at 10 meters AGL (above ground level); blue indicates air flow at 100m; green indicates 500m. Yellow line indicates the international border. Aqua lines denote county boundaries. Dynamically generated through NOAA's Air Resources Laboratory HYSPLIT model. Base map from Google Earth

While the Westmorland, Niland, El Centro, and Calexico monitors measured elevated concentrations, the Brawley monitor was the only monitor to exceed the NAAQS. The Westmorland monitor measured elevated concentrations much like Brawley, however as seen in the HYSPLIT back trajectory models in **Figure 5-5**, surface disturbance was less significant for Westmorland. The Niland trajectory shows that the air parcel crossed the southern end of the Salton Sea reducing the amount of saltation and suspension. The El Centro and Calexico trajectories show that the air parcels traveled over urban and agricultural lands controlled with BACM.

FIGURE 5-5
IMPERIAL COUNTY AIR MONITOR IMPACT DISCUSSION

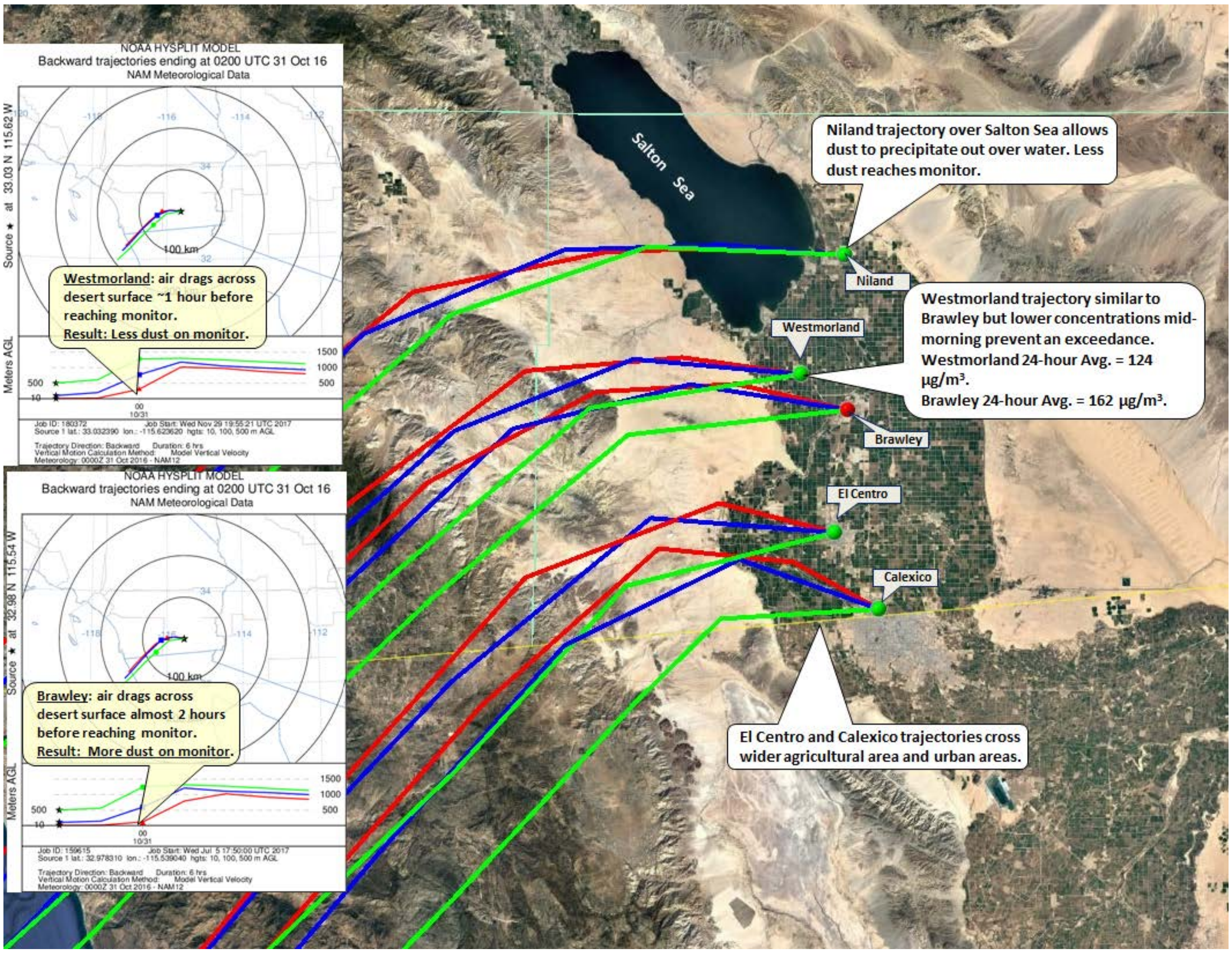


Fig 5-5: The 12-hour HYSPLIT trajectories illustrate the path of the air parcel ending at at 1800 PST on October 30, 2016 for all monitors. HYSPLIT insets depict 6-hour back-trajectories. Red trajectory indicates air flow at 10 meters AGL (above ground level); blue indicates air flow at 100 m; green indicates air flow at 500m. Yellow line indicates the international border. Aqua lines denote county boundaries. Dynamically generated through NOAA's Air Resources Laboratory HYSPLIT model. Base map from Google Earth

Both Westmorland and Brawley measured a spike in PM_{10} concentrations between 1000 and 1200 PST. This was near the time winds shifted westerly and increased. Concentrations at Westmorland measured higher on average than Brawley of 443 µg/m^3 to 317 µg/m^3 between 1000 and 1200 PST. However, as winds shifted WNW during the afternoon and evening hours, air at the 10 meter level approaching Brawley continued longer than the air approaching Westmorland. By sectioning the back-trajectories into six hours between 1200 and 1800 PST as depicted by the HYSPLIT insets in **Figure 5-5**, this difference can be more clearly seen. The added surface level disturbance allowed for the exceedance at the Brawley monitor and not the Westmorland monitor.

Figures 5-6 and Figure 5-7 depict PM_{10} concentrations and wind speeds over a 72-hour period at Brawley and Westmorland. Fluctuations in hourly concentrations at the monitor over 72 hours shows a positive correlation with elevated wind speeds and gusts at upstream sites.

FIGURE 5-6
BRAWLEY PM_{10} CONCENTRATIONS & WIND SPEED CORRELATION

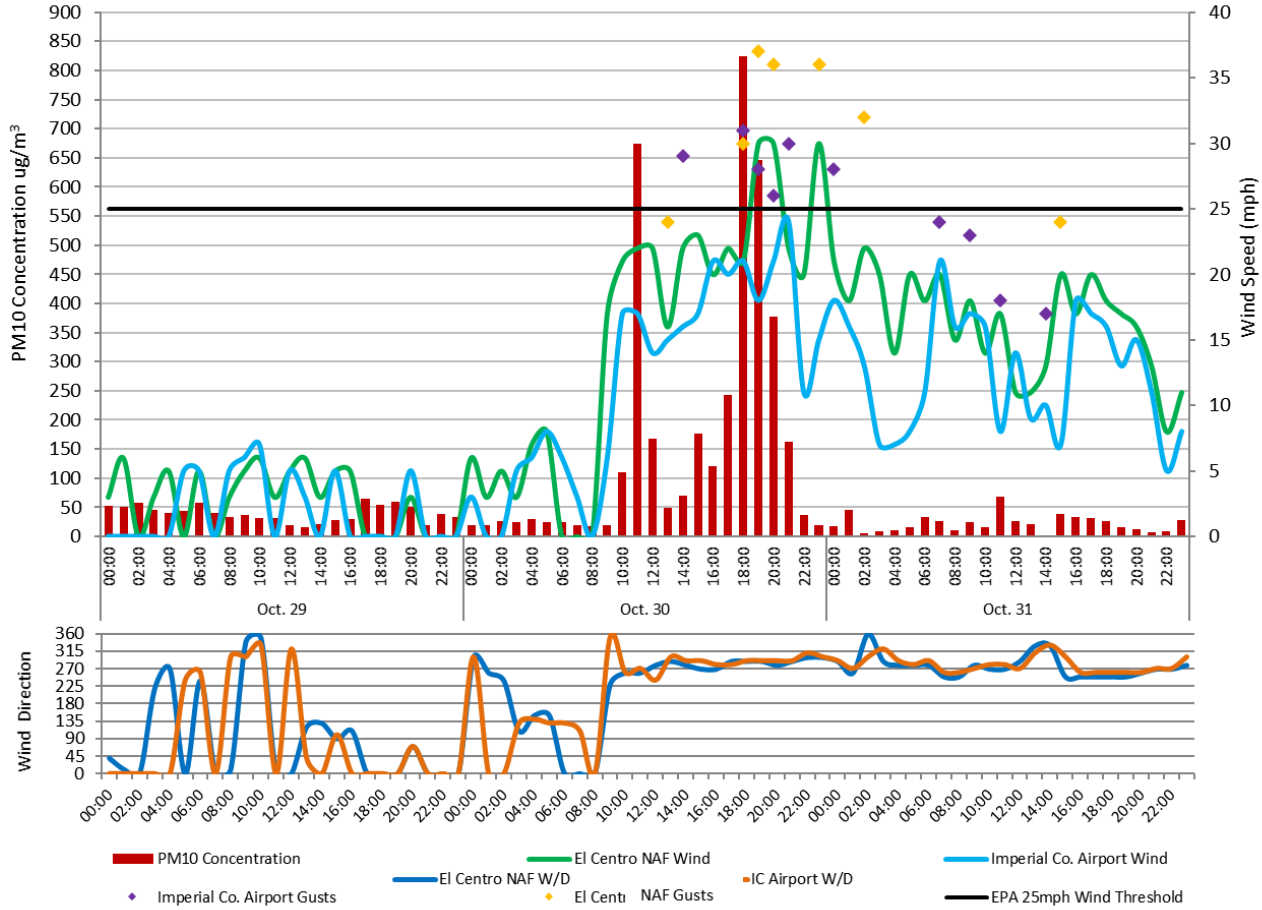


Fig 5-6: Fluctuations in hourly concentrations over 72 hours show a positive correlation with wind speeds, and particularly gusts. Brawley station does not measure wind. Black line indicates 25 mph threshold. Air quality data from the EPA's AQS data bank. Wind data from the NCEI's QCLCD system

FIGURE 5-7
WESTMORLAND PM_{10} CONCENTRATIONS & WIND SPEED CORRELATION

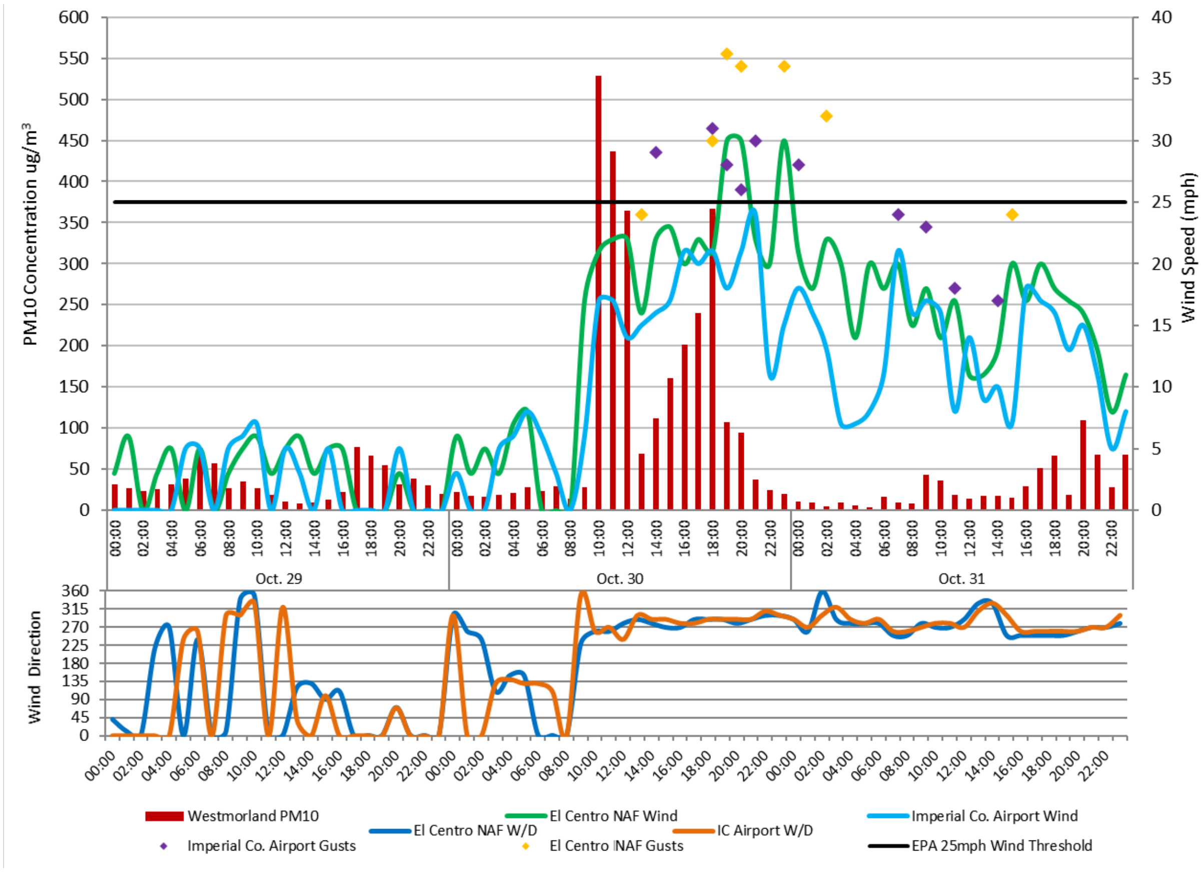


Fig 5-7: Fluctuations in hourly concentrations over 72 hours show a positive correlation with wind speeds, and particularly gusts. Black line indicates 25 mph threshold. Air quality data from the EPA's AQS data bank. Wind data from the NCEI's QCLCD system

Figure 5-8 depicts the relationship between the 72-hour PM_{10} fluctuations by the Brawley and Westmorland monitors together with upstream wind speeds. A positive correlation can be seen, between an increase in wind speeds and gusts with increased concentrations at the monitors. It also more clearly shows the differences in PM_{10} concentrations at critical times during October 30, 2016. While Westmorland shows a higher spike than Brawley between 1000 and 1200 PST, concentrations were more moderate during the afternoon when hourly concentrations at Brawley were highest. **Appendix C** contains additional graphs illustrating the relationship between PM_{10} concentrations and wind speeds from region monitoring sites within Imperial County, eastern Riverside County, and Yuma, Arizona during the wind event.

FIGURE 5-8
PM_{10} CONCENTRATIONS & UPSTREAM WIND SPEED CORRELATIONS

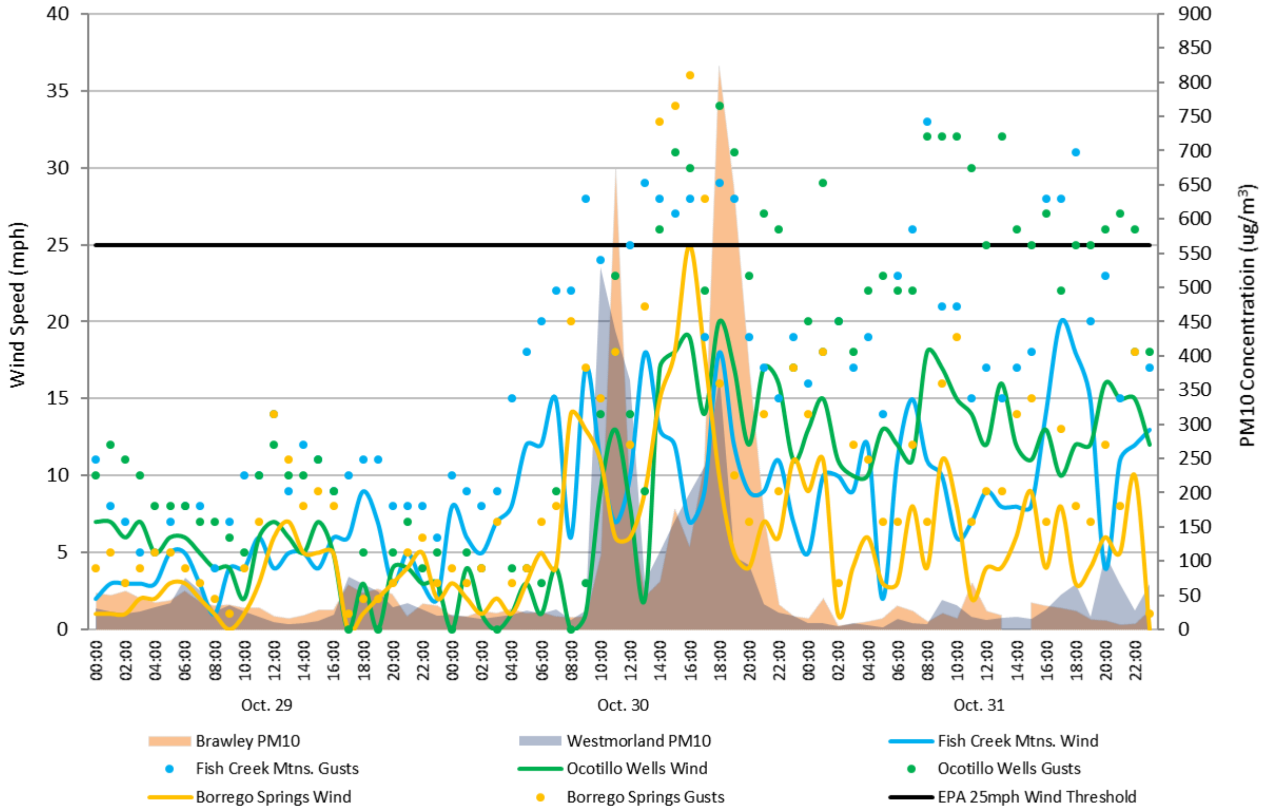


Fig 5-8: This graph depicts the 72-hour PM_{10} fluctuations by the Brawley and Westmorland monitors together with upstream wind speeds. A positive correlation between an increase in wind speeds can be seen, particularly with gusts. Black line indicates the 25mph threshold

Figure 5-9 compares the 72-hour concentrations at Brawley, Calexico, El Centro, Westmorland, and Niland with visibility[10] at local airfields between October 29, 2016 and October 31, 2016. Generally, drops in visibility correspond to highest hourly concentrations at the monitors.

10 According to the NWS there is a difference between human visibility and the visibility measured by an Automated Surface Observing System (ASOS) or an Automated Weather Observing System (AWOS). The automated sensors measure clarity of the air vs. how far one can "see". The more moisture, dust, snow, rain, or particles in the light beam the more light scattered. The sensor measures the return every 30 seconds. The visibility value transmitted is the average 1-minute value from the past 10 minutes. The sensor samples only a small segment of the atmosphere, 0.75 feet therefore an algorithm is used to provide a representative visibility. Siting of the visibility sensor is critical and large areas should provide multiple sensors to provide a representative observation; http://www.nws.noaa.gov/asos/vsby.htm

FIGURE 5-9
72-HOUR TIME SERIES PM_{10} CONCENTRATIONS AND VISIBILITY

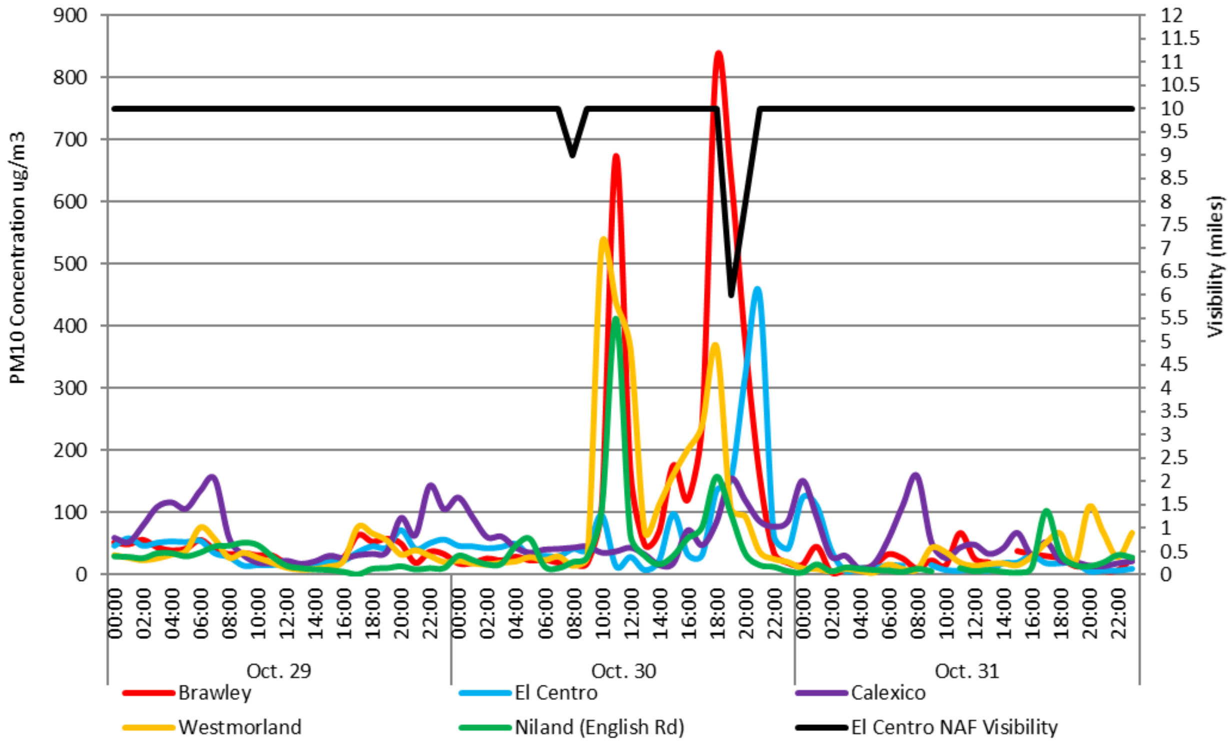


Fig. 5-9: Visibility as reported from El Centro NAF (KNJK) show that visibility dipped significantly at the airfields coincident to peak concentrations at Brawley, Calexico, El Centro, Niland, and Westmorland. Visibility data from the NCEI's QCLCD data bank.

The powerful gusts transported dust on the western edge of the Sonoran Desert and transported it into Imperial County. **Figure 5-10** shows the resulting air quality indices[11] in Brawley during October 30, 2016 due to the dust transported into Imperial County by the high winds. At Brawley air quality remained in the "Green" or Good category (PM10 0-50 µg/m^3) until 12 p.m. At 1 p.m. air quality entered the "Yellow" or Moderate level (PM10 51-100 µg/m^3) and remained there until 9 p.m. At 10 p.m. air quality dropped further into the "Orange" or Unhealthy for Sensitive Groups level (PM10 101-150 µg/m^3) where it remained for the rest of the day. **Appendix A** contains copies of notices as they were issued either as forecast information prior to or on October 30, 2016.

[11] The AQI is an index for reporting daily air quality. It tells you how clean or polluted your air is, and what associated health effects might be a concern for you. The AQI focuses on health effects you may experience within a few hours or days after breathing polluted air. EPA calculates the AQI for five major air pollutants regulated by the Clean Air Act: ground-level ozone, particle pollution (also known as particulate matter), carbon monoxide, sulfur dioxide, and nitrogen dioxide. For each of these pollutants, EPA has established national air quality standards to protect public health .Ground-level ozone and airborne particles are the two pollutants that pose the greatest threat to human health in this country. Source: https://www.airnow.gov/index.cfm?action=aqibasics.aqi

FIGURE 5-10
IMPERIAL VALLEY AIR QUALITY INDEX IN BRAWLEY
OCTOBER 30, 2016

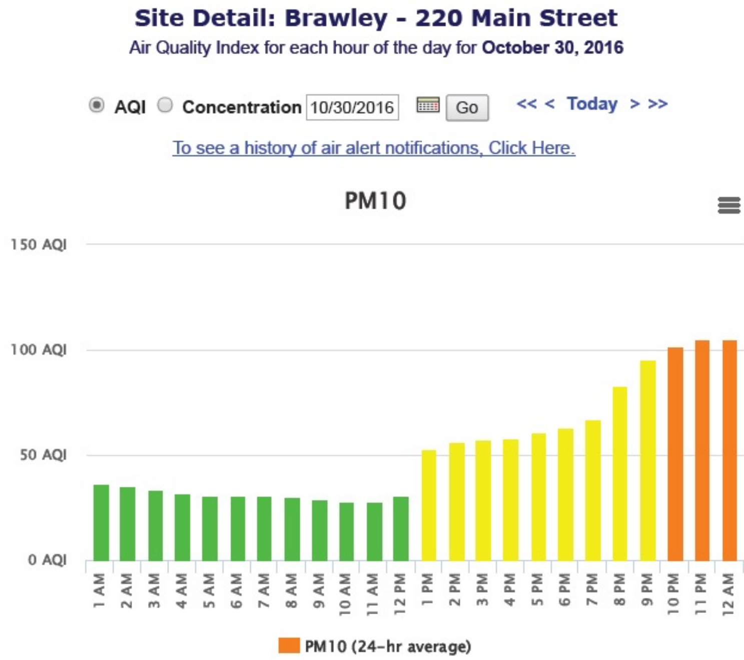


Fig 5-10: The reduced air quality in Brawley shows that the fugitive dust transported by high winds impacted the air quality of the Imperial Valley. Source: ICAPCD archives

V.2 Summary

The preceding discussion, graphs, figures, and tables provide wind direction, speed and concentration data illustrating the spatial and temporal effects of the powerful winds associated with the low pressure system that moved through the region. The information provides a clear causal relationship between the entrained windblown dust and the PM_{10} exceedance measured at the Brawley monitor on October 30, 2016. Furthermore, the advisories and air quality index illustrate the affect upon air quality within the region extending from the southwest portion of Yuma County, Arizona, all of Imperial County, and the southern portion of Riverside County. Large amounts of coarse particles (dust) and PM_{10} were carried aloft by strong westerly winds into the lower atmosphere causing a change in the air quality conditions within Imperial County. The entrained dust originated from as far as the desert areas located west of Imperial County (part of the Sonoran Desert). Combined, the information demonstrates that the elevated PM_{10} concentrations measured on October 30, 2016 coincided with high wind speeds and that gusty west winds were experienced over the southern portion of Riverside County, southeastern San Diego County, all of Imperial County, and parts of Arizona.

FIGURE 5-11
OCTOBER 30, 2016 WIND EVENT TAKEAWAY POINTS

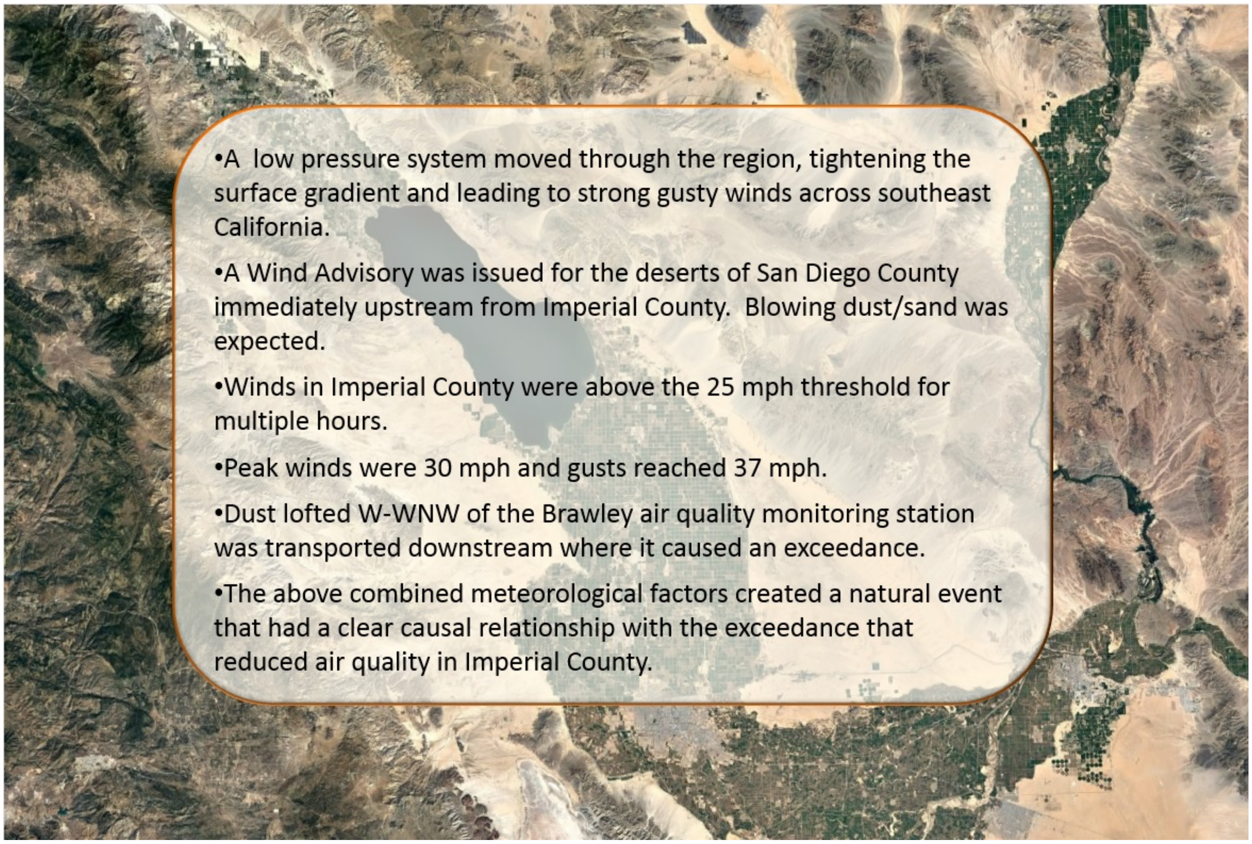


Fig 5-11: Illustrates the factors that qualify the October 30, 2016 natural event which affected air quality as an Exceptional Event

VI Conclusions

The PM_{10} exceedance that occurred on October 30, 2016, satisfies the criteria of the EER which states that in order to justify the exclusion of air quality monitoring data evidence must be provided for the following elements:

TABLE 6-1 TECHNICAL ELEMENTS CHECKLIST EXCEPTIONAL EVENT DEMONSTRATION FOR HIGH WIND DUST EVENT (PM_{10})		DOCUMENT SECTION
1	A narrative conceptual model that describes the event(s) causing the exceedance or violation and a discussion of how emissions from the event(s) led to the exceedance or violation at the affected monitor(s)	6-29; 55
2	A demonstration that the event affected air quality in such a way that there exists a clear causal relationship between the specific event and the monitored exceedance or violation	42-53; 55
3	Analyses comparing the claimed event-influenced concentration(s) to concentrations at the same monitoring site at other times to support the requirement at paragraph (c)(3)(iv)(B) of this section	30-34; 55
4	A demonstration that the event was both not reasonably controllable and not reasonably preventable	35-41; 54
5	A demonstration that the event was a human activity that is unlikely to recur at a particular location or was a natural event	42-53; 55

VI.1 Affects Air Quality

The preamble to the revised EER states that an event is considered to have affected air quality if it can be demonstrated that the event affected air quality in such a way that there exists a clear causal relationship between the specific event and the monitored exceedance or violation. Given the information presented in this demonstration, particularly Section V, we can reasonably conclude that there exists a clear causal relationship between the monitored exceedance and the October 30, 2016 event which changed or affected air quality in Imperial County.

VI.2 Not Reasonably Controllable or Preventable

In order for an event to be defined as an exceptional event under section 50.1(j) of 40 CFR Part 50 an event must be "not reasonably controllable or preventable." The revised preamble explains that the nRCP has two prongs, not reasonably preventable and not reasonably controllable. The nRCP is met for natural events where high wind events entrain dust from desert areas, whose sources are controlled by BACM, where human activity played litter or no direct causal role. This demonstration provides evidence that despite BACM in place within Imperial County, high winds overwhelmed all BACM controls where human activity played little to no direct causal role. The PM_{10} exceedance measured at the Brawley monitor were caused by naturally occurring strong gusty west winds that transported fugitive dust into Imperial County and other parts of southern California from areas located within the Sonoran Desert regions to the west of Imperial County. These facts provide strong evidence that the PM_{10} exceedances at Brawley on October 30, 2016 were not reasonably controllable or preventable.

VI.3 Natural Event

The revised preamble to the EER clarifies that a “Natural Event” (50.1(k) of 40 CFR Part 50) is an event and its resulting emissions, which may recur at the same location where anthropogenic sources that are reasonably controlled are considered not to play a direct role in causing emissions, thus meeting the criteria that human activity played little or no direct causal role. As discussed within this demonstration, the PM_{10} exceedances that occurred at Brawley on October 30, 2016 were caused by the transport of fugitive dust into Imperial County by strong westerly winds associated with a low pressure system that moved over the region. At the time of the event anthropogenic sources were reasonably controlled with BACM. The event therefore qualifies as a natural event.

VI.4 Clear Causal Relationship

The time series plots of PM_{10} concentrations at Brawley during different days, and the comparative analysis of different areas in Imperial and Riverside county monitors demonstrates a consistency of elevated gusty west winds and concentrations of PM_{10} at the Brawley monitoring stations on October 30, 2016 (Section V). In addition, these time series plots and graphs demonstrate that the high PM_{10} concentrations and the gusty west winds were an event that was widespread, regional and not preventable. Arid conditions preceding the event resulted in soils that were particularly susceptible to particulate suspension by the elevated gusty west winds. Days immediately before and after the high wind event PM_{10} concentrations were well below the NAAQS. Overall, the demonstration provides evidence of the strong correlation between the natural event and the entrained fugitive emissions to the exceedances on October 30, 2016 .

VI.5 Historical Concentrations

The historical annual and seasonal 24-hr average PM_{10} values measured at the Brawley monitors were historically unusual compared to a multi-year data set (Section III).

Appendix A: Public Notification that a potential event was occurring (40 CFR §50.14(c)(1))

This section contains forecasts issued by the National Weather Service and Imperial County on or around October 30, 2016. The data show a region-wide increase in wind speeds and wind gusts coincident with the arrival of dust and high PM_{10} concentrations in Imperial County.

Appendix B: Meteorological Data.

This Appendix contains the time series plots, graphs, wind roses, etc. for selected monitors in Imperial and Riverside Counties. These plots, graphs and tables demonstrate the regional impact of the wind event.

Appendix C: Correlated PM_{10} Concentrations and Winds.

This Appendix contains the graphs depicting the correlations between PM_{10} Concentrations and elevated wind speeds for selected monitors in Imperial and Riverside Counties. These graphs demonstrate the region wide impact of the wind event.

Appendix D: Regulation VIII – Fugitive Dust Rule.

This Appendix contains the compilation of the BACM adopted by the Imperial County Air Pollution Control District and approved by the United States Environmental Protection Agency. A total of seven rules numbered 800 through 806 comprise the set of Regulation VIII Fugitive Dust Rules.